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TRANSCRIPT OF RECORD

(IN THREE VOLUMES)

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1939 1940

No. 61

THE UNITED STATES OF AMERICA, PETITIONER

vs.

APPALACHIAN ELECTRIC POWER COMPANY

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE FOURTH CIRCUIT

VOLUME 1

PETITION FOR CERTIORARI FILED JANUARY 26, 1940
CERTIORARI GRANTED MARCH 4, 1940

SUPREME COURT OF THE UNITED STATES

OCTOBER TERM, 1939

No. 674

THE UNITED STATES OF AMERICA, PETITIONER

vs.

APPALACHIAN ELECTRIC POWER COMPANY

ON WRIT OF CERTIORARI TO THE UNITED STATES CIRCUIT COURT OF APPEALS FOR THE FOURTH CIRCUIT

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Direct	579	465
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T. G. Skaggs (deposition)—		
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I. C. Stover (deposition)—		
Direct	594	477
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Direct	599	482
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Redirect	612	492
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Re-redirect	612	492
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Recross	657	529
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J. J. Dirzulaitis—		
Direct	664	535
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Redirect	673	541
Recross	674	542
Charles H. Pierce—		
Direct	676	543
Cross	703	565
Redirect	725	582

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	Original	Print
Glen E. Edgerton—		
Direct	732	587
Cross	752	606
Redirect	770	619
Recross	780	626
Mrs. Minnie Lee Ward—		
Direct	787	632
Cross	790	635
Redirect	792	636
Recross	793	637
W. S. Winn—		
Direct	794	637
Cross	808	649
Redirect	889	711
Recross	894	715
Harry M. Trippe—		
Direct	896	716
Cross	926	748
Redirect	955	768
Edwin W. Kramer—		
Direct	956	769
Cross	1000	805
Earl E. Tester—		
Direct	1051	847
Cross	1084	871
Redirect	1127	900
Recross	1130	902
H. G. Gerdes—		
Direct	1131	903
Cross	1162	926
Redirect	1189	947
Recross	1194	950
Col. Lewis H. Watkins—		
Direct	1203	957
Cross	1256	1000
Redirect	1363	1004
Recross	1365	1006
John R. Douglass—		
Direct	1367	1082
Cross	1384	1095
Redirect	1415	1116
Recross	1421	1120
Capt. C. Stone—		
Direct	1423	1121
Cross	1435	1130
Redirect	1439	1132
Recross	1439	1132

	Original	Print
Record from D. C. U. S., etc.—Continued.		
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E. A. Sherman—		
Direct [omitted in printing]	1441	
C. L. Forsling—		
Direct [omitted in printing]	1453	
Cross [omitted in printing]	1462	
Redirect [omitted in printing]	1472	
Recross [omitted in printing]	1474	
Dr. H. T. Cory—		
Direct [omitted in printing]	1477	
Cross [omitted in printing]	1493	
Redirect [omitted in printing]	1498	
Recross [omitted in printing]	1501	
Redirect [omitted in printing]	1503	
Recross [omitted in printing]	1506	
Redirect [omitted in printing]	1508	
H. G. Gerdes (recalled)—		
Direct	1510	1133
Cross	1526	1150
Redirect	1532	1155
Cross	1532	1155
Redirect	1546	1166
Recross	1548	1168
Capt. Phillip C. Elsey—		
Direct	1550	1169
Cross	1561	1178
Redirect	1577	1191
P. A. Gragnon—		
Direct	1579	1193
Cross	1603	1211
Redirect	1620	1224
John D. Fitch—		
Direct	1625	1228
Cross	1630	1231
Redirect	1632	1233
Recross	1632	1233
Roger B. McWhorter—		
Direct	1633	1233
Cross	1674	1266
Redirect	1740	1333
Recross	1743	1335
James W. Johnson—		
Direct	1745	1338
Cross	1792	1380
Redirect	1808	1400
Recross	1812	1410
Dr. F. F. Barnes—Direct [omitted in printing]	1821	
John A. Davenport—		
Direct	1835	1415
Cross	1861	1434

	Original	Print
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H. G. Gerdes (recalled)—		
Direct	1871	1441
Cross	1896	1465
Redirect	1934	1493
Recross	1937	1495
Testimony for defendant:		
C. Rufus Spangler—		
Direct	1939	1498
Cross	1941	1500
Redirect	1944	1503
W. H. Spangler—		
Direct	1945	1503
Cross	1946	1505
Redirect	1951	1509
S. L. Buckland—		
Direct	1952	1509
Cross	1955	1511
Redirect	1960	1516
Recross	1962	1517
B. C. Lilly—		
Direct	1962	1517
Cross	1963	1518
Redirect	1970	1524
Recross	1971	1524
James Adair, Sr.—		
Direct	1971	1524
Cross	1973	1526
Redirect	1976	1528
Recross	1977	1529
N. A. Kersey—		
Direct	1979	1530
Cross	1982	1532
Redirect	1986	1536
H. Palmer Roberts—		
Direct	1986	1536
Cross	1988	1538
J. B. Talbot—		
Direct	1991	1540
Cross	1992	1541
Redirect	1996	1543
William Ingles—		
Direct	1996	1544
Cross	1996	1544
William R. Gerald—		
Direct	1999	1547
Cross	2002	1549
Redirect	2006	1552
Recross	2006	1552

	Original	Print
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William R. Gerald (deposition)—		
Direct	2007	1552
Cross	2009	1554
A. Moore—		
Direct	2011	1555
Cross	2013	1557
Isaac Huff—		
Direct	2018	1561
Cross	2020	1562
Redirect	2023	1564
J. H. Knode—		
Direct	2024	1565
Cross	2031	1571
Redirect	2039	1577
F. B. Kegley—		
Direct	2041	1579
Cross	2070	1604
Redirect	2099	1629
Recross	2102	1631
E. C. Gannaway—		
Direct	2104	1632
Cross	2105	1633
Redirect	2108	1635
Recross	2108	1635
N. B. Harvey—		
Direct	2109	1636
Cross	2111	1638
Redirect	2118	1643
Recross	2118	1643
W. R. Hundley (deposition)—		
Direct	2119	1643
Cross	2123	1647
Redirect	2125	1648
Recross	2126	1649
Redirect	2126	1549
John G. Osborne—		
Direct	2127	1649
Cross	2130	1652
Redirect	2134	1655
Recross	2135	1656
Robert C. McWane—		
Direct	2135	1656
Cross	2143	1662
Redirect	2152	1669
Recross	2153	1670

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	Original	Print
Frank P. Turner—		
Direct	2155	1671
Cross	2157	1672
J. B. Snethlage—		
Direct	2158	1673
Cross	2159	1674
A. A. L. Mathews—		
Direct	2160	1675
Cross	2174	1686
Redirect	2195	1702
Recross	2197	1704
Harold W. Buck—		
Direct	2198	1704
Cross	2203	1709
R. J. Holden—		
Direct	2216	1720
Cross	2236	1737
Redirect	2254	1751
Recross	2259	1756
H. S. Slocum—		
Direct	2260	1757
Cross	2273	1767
T. A. Patton—		
Direct	2282	1774
Cross	2283	1775
Rufus W. Putnam—		
Direct	2286	1777
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S. M. Yarbro—		
Direct	2355	1834
Cross	2355	1834
Harold A. Thomas—		
Direct	2364	1841
Cross	2422	1883
Redirect	2488	1930
Recross	2504	1941
Daniel W. Mead—		
Direct	2506	1942
Cross	2530	1972
Redirect	2579	2011
F. W. Scheidenhelm—		
Direct	2581	2012
Cross	2664	2077
Redirect	2710	2118
Recross	2714	2123
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Recross	2721	2132

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John E. Carpenter (recalled)—		
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Re-direct	2772	2172
Re-cross	2774	2173
Re-direct	2775	2174
Rowland P. Castle—		
Direct	2777	2175
Cross	2788	2184
Re-direct	2800	2193
Harry R. Bright—		
Direct	2802	2194
Cross	2806	2199
W. H. Marshall—		
Direct	2810	2202
Cross	2815	2205
Thomas H. Graham—Direct	2828	2214
Roger B. McWhorter (recalled)—		
Direct	2832	2216
Cross	2840	2225
Lewis H. Watkins—		
Direct	2845	2228
Cross	2858	2240
H. G. Gerdes (recalled)—		
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Cross	2891	2269
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Exhibit No. 92—1925, August 20—Report of General Taylor, Chief of Engineers on Declaration of Intention for project No. 739	3207	2517
Exhibit No. 93—1925, July 23—Report of District Engineer, Major A. K. B. Lyman and Endorsement (7/25/29) Division Engineer, C. W. Kutz on declaration for project No. 739	3214	2522
Exhibit No. 94—1925, October 15—Letter and memorandum of Major Trippe, District Engineer to Lt. Col. Edgerton, on probable effects of proposed Radford project on Kanawha River	3218	2524
Exhibit No. 95—1926, April 7—Letter from Merrill, Executive Secretary, to General Taylor, C. of E., transmitting data with respect to Pitt River. Attached is memo initialed "R. W. D." and diagram of variations on Pitt and Sacramento Rivers (original exhibit)	3221	2526
Exhibit No. 96—1926, July 23—Report of Hubert Deakyne, C. of E., to Merrill Executive Secretary on declaration for project No. 739	3222	2526
Exhibit No. 97—1925, December 29—Report of General Taylor, C. of E., to Executive Secretary on declaration for project No. 739 (original exhibit)	3224	2527
Exhibit No. 98—1927, April 12—Report of General Deakyne, C. of E.; 1926, December 22—Report of Major Trippe, District Engineer; 1927, January 13—1st Endorsement Col. Kutz, Division Engineer. In dealing with application for license for project #739	3232	2533
Exhibit No. 99—1925, October 22—List of 22 affidavits submitted to Federal Power Commission for consideration upon Declaration of Intention of New River Development Company	3257	2556

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Plaintiff's exhibits—Continued. Original Print

Exhibit No. 100—1926, March 2—Transcript of hearing before Federal Power Commission on Declaration of Intention 3305 2584

Exhibit No. 101—1926, October 28; September 28; November 20—re Application for license. Notice of public hearing at Radford, September 28, 1926. Mailing list of notices September 28, 1926. Transcript of public hearing at Radford, October 28, 1926. Statement filed on behalf of Appalachian Electric Power Co. regarding protests, November 20, 1926 ..... 3329 2604

Exhibit No. 102—1926, September 2—Letter from Curtis, Mallet-Prevost, Colt & Mosle to Federal Power Commission enclosing assignment of declaration from Development Co. to A. E. P. Co. and application for license of A. E. P. Co 3355 2624

Exhibit No. 103—1925, December 9—Telegram to Mr. Merrill, Executive Secretary, from Mr. Kramer re Pitt River 3356 2625

Exhibit No. 104—1925, December 15—Letter to Mr. Merrill from Mr. Kramer re Pitt River and enclosing hydrographs 3359 2626

Exhibit No. 105—1927, May 2—Letter from Mr. Bonner to Mr. Merrill enclosing copy of Kramer's report of Klamath River 3360 2628

Exhibit No. 106—1926, October 24—"Memorandum to Federal Power Commission re Declaration of Intention of New River Development Company" prepared by Curtis, Mallet-Prevost, Colt & Mosle (original exhibit) 3383 2635

Exhibit No. 106-A—1925, October 23—Letter from L. J. Bevan to C. M. Micou, re drainage areas and run-off (original exhibit) 3383 2635

Exhibit No. 106-B—Memorandum of request of New River Development Company in regard to Report of Chief of Engineers dated Aug. 20, 1925, upon the proposed project of the Company for a water power development on New River, in Virginia, with respect to which declaration of intention has been filed by the Company with the Federal Power Commission, dated Oct. 26, 1925 ..... 3384 2635

Exhibit No. 106-C—1925, October 1, 1925—"Supplemented Memorandum re Declaration of Intention of New River Development Company (original exhibit) 3388 2638

Exhibit No. 107—1926, February 20—Letter from Mr. Merrill, Executive Secretary to, Bascom Slemp giving notification of public hearing of March 2, 1926 (original exhibit) 3388 2638

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Exhibit No. 108—1930, October 16—Letter from C. M. P. C. M. to Federal Power Commission enclosing new drawings for minor part license to be substituted for certain drawings filed with original application for license (original exhibit)	3388	2638
Exhibit No. 109—1926, April 15—Charge sheet pertaining to removal of General Taylor's report dated December 29, 1925, from files by F. P. C. (original exhibit)	3388	2638
Exhibit No. 110—"Record of the daily gage readings at Lock No. 24, Ohio River" (original exhibit)	3388	2638
Exhibit No. 111—"Record of daily gage readings at Lock No. 25, Ohio River" (original exhibit)	3388	2638
Exhibit No. 112—4 sheets being "gage readings of Locks Nos. 2, 3, and 4, Kanawha River, and Locks Nos. 26, 27, and 28, Ohio River, during low water periods of 1921, 1925, 1930, and 1932 (original exhibit)	3388	2638
Exhibit No. 113—Diagram showing hydrographs at gaging stations (Kanawha and New Rivers) with published mean daily flows July and August, 1932. Prepared U. S. Engineers Office, Huntington, W. Va., September 1935 (original exhibit)	3388	2638
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Exhibit No. 115—1936, January—Diagram—Kanawha & New Rivers, Discharge at gaging stations—Data compiled from Automatic Water Stage Recorder—U. S. Engineer Office, Huntington, W. Va., January 1936 (original exhibit)	3389	2639
Exhibit No. 116—1936, July 7—Diagram "Kanawha River Profile—Backwater studies—U. S. Engineer Office, Huntington, W. Va. (original exhibit)	3389	2639
Exhibit No. 117-A—1936, July 9—Diagram "Rating Curves—Kanawha River Lock No. 2, Mile 84.8, London Dam, Mile 82.81, and Lock No. 3, Mile 79.7—U. S. Engineer Office, Huntington, W. Va. (original exhibit)	3389	2639
Exhibit No. 117-B—1935, December 10—Diagram "U. S. Engineer Office, Huntington, W. Va., Rating Curves—Kanawha River, Locks Nos. 4 & 5, and Marmet" (original exhibit)	3389	2639
Exhibit No. 117-C—1935, December 5—Diagram—"Rating Curves—Kanawha River—Locks Nos. 6, 7, 8" (original exhibit)	3389	2639

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Exhibit No. 117-D—1936, July 8—Diagram "Kanawha River—Rating Curves Locks No. 9 and Winfield—U. S. Engineer Office, Huntington, W. Va." (original exhibit) 3389 2639

Exhibit No. 117-E—1935, December 5—Diagram "Rating Curves—Kanawha River Locks Nos. 10 and 11" (original exhibit) 3389 2639

Exhibit No. 117-F—1935, December 10—Diagram "Rating Curves—Ohio River below Point Pleasant at Lock No. 26—U. S. Engineer Office, Huntington, W. Va." (original exhibit) 3390 2640

Exhibit No. 118—1935, December—Diagram "Kanawha River Profile—Six & Nine feet projects"—U. S. Engineer Office, Huntington, W. Va. (original exhibit) 3390 2640

Exhibit No. 119—1935, December—Diagram "Kanawha River and Tributaries—proposed improvements"—U. S. Engineer Office, Huntington, W. Va. (original exhibit) 3390 2640

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Exhibit No. 121—July 4-21, 1936—Gage recorder chart for New River at Eggleston, Va. (original exhibit) 3390 2640

Exhibit No. 122—July 6-21, 1936—Gage recorder chart for New River at Hinton (Packs Ferry), W. Va. (original exhibit) 3390 2640

Exhibit No. 123—1919, August 29. Request for permit for repairs and replacements by Electro Metallurgical Company with following enclosures: (1) 1919, Aug. 29; Letter from W. J. Knapp, V-P, Electro-Met. Co. to Secretary of War. (2) 1919, Sept. 15 and 17; 1st and 2nd Endorsements by Howell and Beach, C. of E. (3) 1919, Sept. 27; 3rd End. by Pillsbury, C. of E. (4) 1919, Oct. 4; 4th End. by Howell, C. of E. (5) Plan of proposed location of replacement dam. (6) 1899, Mar. 2; Letter from Chief of Engineers Office to Major Bixby, C. of E., enclosing permit. (7) 1899, Feb. 27—Permit to Wilson Aluminum Co. (original exhibit) 3390 2640

Exhibit No. 123-A—1934, October 24; Copies of correspondence and reports relating to the Kanawha Falls Plant of Elec-Met. Co. as follows: (1) 1934, Oct. 24; Letter from Capt. Clay, C. of E. to McNinch Chairman, F. P. C. enclosing the following: (2)

Record from D. C. U. S., etc.—Continued.
Plaintiff's exhibits—Continued. Original Print
1898, Nov. 12; letter from Wilson Aluminum Co. to Secretary of War. (3) Part of handwritten letter to Brig. Gen'l John M. Wilson, Chief of Eng. dated January 26, 1899. (4) War Department memorandum. (5) 1899, Feb. 13; Letter from Major Bixby to Brig. Gen. John M. Wilson, Chief of Eng. (6) War Department memo. (7) 3 endorsements by War Department. (8) Copy of telegram dated Feb. 17, 1899, from Mr. Wilson, Chief of Engineers to Wilson Aluminum Co. (9) Letter dated Feb. 18, 1894, from Wilson Aluminum Co. to Mr. Wilson, Chief of Engineers. (10) Letter from Sec. of War, Feb. 27, 1899, to Wilson Alum. Co: (original exhibit) 3391 2641
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Exhibit No. 125—1926, November—Protest of Public Service Commission of W. Va 3396 2643
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Exhibit No. 132—Plate 11. Diagram showing change in wave as it passes downstream (original exhibit) 3414GG 2675
Exhibit No. 133—March 1930. Discharge hydrograph wave study of New River at Allisonia, Va., from March 11, 1930–March 31, 1930 (original exhibit) 3414GG 2675
Exhibit No. 134—March, 1930—Discharge hydrograph wave study New River at Eggleston, Va. from March 11, 1930–March 31, 1930 (original exhibit) 3414GG 2675

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Plaintiff's exhibits—Continued. Original Print

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Exhibit No. 136—March, 1930—"Discharge hydrograph wave stu ly New River at Hinton, W. Va., March 13, 1930–March 30, 1930 (original exhibit) 3414GG 2675

Exhibit No. 137—March, 1930—"Discharge hydrograph wave study New River at Caperton, W. Va.—March 12, 1930–April 3, 1930 (original exhibit) 3414GG 2675

Exhibit No. 138—March, 1930—"Discharge hydrograph wave study New River at Damsite 'A' near Radford, Va., March 11, 1930, to March 31, 1930" (original exhibit) 3414GG 2676

Exhibit No. 139—1930, March—"Discharge hydrograph wave study at Kanawha River at Kanawha Falls, W. Va., March 12, 1930, to April 1, 1930" (original exhibit) 3415 2676

Exhibit No. 140—1930, March—"Discharge hydrograph wave study of New River at Ivanhoe, March 12, 1930, to March 31, 1930" (original exhibit) 3415 2676

Exhibit No. 141—1930, March—"Discharge hydrograph wave study of Kanawha River at Montgomery, W. Va. (Lock #. 2), March 14 to March 31, 1930" (original exhibit) 3415 2676

Exhibit No. 142—1935, System Load Curve, A. E. P. Co. and Amer. Gas & Electric Co.—Weekday, Oct. 28, 1935, Sat. Nov. 2nd, 1935, and Sunday, Nov. 3rd, 1935 3416 2676

Exhibit No. 143—1930, June 1, chart "New Kanawha River Power Waves, 3/11/30 to 4/3/30". (original exhibit) 3418 2676

Exhibit No. 144—10 sheets: Plans of locks and dams, Nos. 2 to 11, inclusive, on Kanawha River, as follows:

(a) Kanawha River—Lock and Dam No. 2;
(b) Kanawha River—Lock and Dam No. 3;
(c) Kanawha River—Lock and Dam No. 4;
(d) Kanawha River—Lock and Dam No. 5;
(e) Kanawha River—Lock and Dam No. 6;
(f) Kanawha River—Lock and Dam No. 7;
(g) Kanawha River—Lock and Dam No. 8;
(h) Kanawha River—Lock and Dam No. 9;
(i) Kanawha River—Lock and Dam No. 10;
(j) Kanawha River—Lock and Dam No. 11 (original exhibit) 3418 2676

Exhibit No. 145—1935—74th Congress, 1st Session, House Doc. 91, 308 Report of Kanawha River, W. Va., Va., and N. C 3419 2677

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Exhibit No. 147—Views of shoals and rapids on unimproved sections of New River between Wiley Falls, mile 88.6, and Radford, mile 146.1, and between Allisonia, mile 173.3, and Austinville Lead Mine, mile 190.0—June 22–29, 1936 (original exhibit) 3445 2714
Exhibit No. 148—Photograph of stern of boat showing type of propeller guard in July 1936 (original exhibit) 3445 2714
Exhibit Nos. 149–151, inclusive—Photographs of Gerdes' Party at Bull Falls in July 1936 (original exhibit) 3445 2714
Exhibit Nos. 152–154, inclusive—Photograph of Negro at Bull Falls in a rowboat in July 1936 (original exhibit) 3445 2714
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Exhibit No. 156—Record of hearing before State Corporation Commission containing application and copy of State license (original exhibit) 3445 2714
Exhibit No. 157—Pilot license of John R. Douglass (read into the record) (omitted) 3445 2715
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Exhibit No. 159—1922, June 12, letter from Geo. Otis Smith, Director U. S. G. S., including the Report #34 enclosed in said letter (excluded) 3445 2715
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Exhibit No. 183—Views of pools, shoals, rapids, and dams of Kanawha River and New River between London Lock, W. Va., and Hawks Nest, W. Va.—July 22, 1936 (original exhibit) 3446 2715

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Exhibit Nos 186–187—Maps and deed descriptions, re Bluestone reservoir (original exhibits) 3451 2718
Exhibit No. 188—Key property map of A. E. P. Co. for Bluestone reservoir (original exhibit) 3452 2718
Exhibit No. 189—Report (pp. 3–4, 9–39) of Commissioners appointed to view certain rivers within Commonwealth of Virginia (original exhibit) 3454 2718
Exhibit No. 189-A—Map accompanying exhibit No. 189, John Marshall report (original exhibit) 3478 2735
Exhibit No. 190—Series of maps entitled "New River Survey, 1872 and 1878" (original exhibit) 3478 2735
Exhibit No. 191—Kanawha Valley Power Company license for project #1175 W. Va., including London and Marmet Dams (original exhibit) 3478 2735
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Exhibit No. 194—Photostat of the chart from automatic gage, at Caperton, W. Va., for period August 8 to August 21, inclusive (original exhibit) 3478 2735
Exhibit No. 195—Blueprint of the recording gage chart at Kanawha Falls, for period July 30 to August 24, inclusive, 1930 (original exhibit) 3478 2736
Exhibit No. 196—Profile of New River, N. C., W. Va. and Va. (original exhibit) 3479 2736
Exhibit No. 197—Map styled "Railroads" (original exhibit) 3481 2736
Exhibit No. 198—Map entitled "New River, Va. and W. Va., Navigation improvements between Hinton and Wilson Creek, 1877 to 1889" (original exhibit) 3482 2736
Exhibit No. 199—Load curve of the Appalachian Electric Power Co. for week ending November 3, 1935 (original exhibit) 3484 2736
Exhibits Nos. 200–200-B—3 prints, U. S. Eng. Office, Huntington, W. Va., showing navigation features (barge lift, log chute, etc.) for Bluestone reservoir project (original exhibits) 3486 2736

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Exhibit No. 202—Map showing ferries in operation prior to 1935 (original exhibit) 3486 2737
Exhibit No. 203—Photograph album of ferries on New River (original exhibit) 3486 2737
Exhibit No. 204—Illustration showing how Radford project could affect operating results of Bluestone development (original exhibit) 3486 2737
Exhibit No. 205—Photograph taken to show or to determine the direct measurement thickness of sediment in Byllesby reservoir (original exhibit) 3486 2737
Exhibit No. 207—Sedimentation map of Washington Mills reservoir showing original and present contours (original exhibit) 3486 2737
Exhibit Nos. 208–209—Topographic maps of sections of Washington Mills reservoir showing conditions—April 17 and April 23, 1936—after break-down (original exhibits) 3486 2737
Exhibit No. 210—Cross sections showing profiles on two ranges across the Washington Mills reservoir as of 4/17, and again on 4/23, 1936 (original exhibit) 3487 2737
Exhibit No. 211—Columnar sections of borings through sediment of Washington Mills reservoir (original exhibit) 3487 2737
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Exhibit No. 213—Chart showing longitudinal profiles of Byllesby reservoir (original exhibit) 3487 2738
Exhibit No. 214—Map of Buck reservoir showing present shore line (original exhibit) 3487 2738
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Exhibit Nos. 221–221–E, inclusive—Charts of the Ohio River, Pittsburgh, Pa. to mouth showing topography and soundings (original exhibits) 3488 2738
Exhibit No. 223—Federal Power Commission, National Power Survey, Principal Generating Plants and Electric transmission lines, United States, 1935 (original exhibit) 3488 2738
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Exhibit No. 226—Chart—"Study showing operation of Radford with stream flow conditions, as of the week ending Sunday, November 2, 1930, based on load curve, shape proportional to system load reported by Appalachian Electric Co., for week ending November 3, 1935" (original exhibit)	3491	2739
Exhibit No. 227—Map—"Appalachian Electric Power Co., wave study, New and Kanawha Rivers, March 1930" (original exhibit)	3493	2739
Exhibit No. 228—Map—"New River and Kanawha River Power Waves, March 11 to April 3, 1930" (original exhibit)	3493	2740
Exhibit No. 229—Chart—"Automatic Gauge Records, London and Marmet June 15–19, 1936" (original exhibit)	3495	2740
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Exhibit No. 230—Profile of London, Marmet, and Dam No. 6 pools for June 16, 1936 (original exhibit)	3495	2740
Exhibit No. 230-A—Corrected Exhibit No. 230 (original exhibit)	3495	2740
Exhibit No. 231—Letter dated March 1, 1928, Curtis, Mallet-Prevost, Colt, & Mosle to Federal Power Commission, re Project No. 739, A. E. P. Co. (original exhibit)	3495	2740
Exhibit No. 232—Executive Order of the President authorizing the construction of the Bluestone reservoir project on New River (original exhibit)	3495	2740
Exhibit No. 233—Letter from Wm. W. Belknap, Secretary of War, in answer to the resolution of the House, on February 3, 1871, House Document No. 110, concerning James River and Kanawha Canal (original exhibit)	3495	2740
Exhibit No. 234—"The Congressional Globe"—1873, page 204 and page 206, adoption of resolution offered by Senator Windom (original exhibit)	3495	2740
Exhibit No. 235—"Journal of the House of Delegates of the State of West Virginia for the 11th Session, 1872–3" re James River and Kanawha Canal (original exhibit)	3495	2741
Exhibit No. 236—Report of the Committee of the House of Representatives, containing report No. 76 of the 3rd session of the 42nd Congress, re James River & Kanawha Canal (original exhibit)	3496	2741
Exhibit No. 237—"Congressional Record," Special Session of the Senate of the United States, March 4 to 26, 1873, Volume #1, re James River and Kanawha Canal (original exhibit)	3496	2741

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Exhibit No. 238—Report of Major Craighill with report of Engineers Hutton and Harris, "James River and Kanawha Canal, United States Engineer Office, Baltimore, Md., April 11, 1873" (original exhibit) 3496 2741

Exhibit No. 239—Letter from Senator Davis, of the State of West Virginia, to Sec. of War, W. W. Belknap, dated November 12, 1873, re James River and Kanawha Canal [omitted in printing] 3497 2741

Exhibit No. 240—Report of the Board of Engineers of March 18, 1874, on the James River and Kanawha Canal [omitted in printing] 3499 2741

Exhibit No. 241—Report 307, Part 1, Senate, 43rd Congress, 1st Session, "Select committee on transportation routes to the seaboard, April 24, 1874" (original exhibit) 3565 2741

Exhibit No. 242—Photostatic copy of four pages from "Congressional Record," year 1874, re James River & Kanawha Canal (original exhibit) 3565 2741

Exhibit No. 243—Statutes at large, Volume 18, Part 3, Page 237, etc., re Act passed June 23, 1874, chapter 457, for estimates and surveys on transportation routes to the seaboard (original exhibit) 3565 2742

Exhibit No. 244—Report of Major Craighill, Corps of Engineers, U. S. A., entitled "Third Subdivision of the Central Transportation Route, January 13, 1875" (original exhibit) 3565 2742

Exhibit No. 245—Letter (pp. 54–57 printed herein) from the Sec. of War, etc., Senate Document No. 15, 44th Congress, 2nd Session, containing the reports of Major Craighill and Brig. Gen. Humphreys, Nov. 10, 1876 (original exhibit) 3567 2742

Exhibit No. 246—U. S. G. S. Report No. 20, the Whitetop Area, Virginia-Tennessee (original exhibit) 3575 2748

Exhibit No. 247—Photostatic copy of hearing before Major H. M. Trippe, re Diversion of New River to N. C. Jan. 13, 1925 (original exhibit) 3575 2749

Exhibit No. 248—Copy of letter addressed to the Hon. R. J. Noell, East Radford, Va., and signed by R. J. Holden, Professor of Geology, dated March 4, 1936 (original exhibit) 3575 2749

Exhibit Nos. 249–252, inclusive—"Aerial photos of certain reaches of New River, being Nos. 35, 58, 56, 57, in Government Exhibit No. 273" (original exhibits) 3575 2749

Exhibit No. 254—Letter dated November 14, 1927, to Major E. D. Ardery on "New River Development #6, Radford, Geological Examination," signed by F. W. Scheidenhelm (original exhibit) 3575 2749

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Plaintiff's exhibits—Continued. Original Print

Exhibit No. 255—Letter dated November 17, 1927, to Major E. D. Ardery from F. W. Scheidenhelm on "New River Development No. 6 (Radford), Geological Examination" (original exhibit) 3575 2749

Exhibit No. 256—Letter dated October 16, 1931, to Major Fred W. Herman from F. W. Scheidenhelm, pertaining to maintaining pool levels at dams 2, 3, and 4 on Kanawha River (original exhibit) 3575 2749

Exhibit No. 257—Letter dated September 18th, 1934, to Major John F. Conklin on subject of "Hydroelectric project of Appalachian Electric Power Company on New River near Radford, Va.," by F. W. Scheidenhelm (original exhibit) 3576 2749

Exhibit No. 258—Letter of April 2, 1936, to Major John F. Conklin on "Radford Hydro Project of Appalachian Electric Power Company, Capacity Curve of Reservoir," by F. W. Scheidenhelm (original exhibit) 3576 2749

Exhibit No. 259—Letter dated April 12, 1932, to Major Fred W. Herman, on New River Power Wave Study, by F. W. Scheidenhelm (original exhibit) 3576 2750

Exhibit No. 260—Letter dated April 20, 1932, to United States Engineer Department, signed by Daniel W. Mead and F. W. Scheidenhelm, re "New-Kanawha River Power Wave Study" (original exhibit) 3576 2750

Exhibit No. 261—Telegram dated December 10, 1930, addressed to F. E. Bonner, Executive Secretary, Federal Power Commission, sent by F. W. Scheidenhelm (original exhibit) 3576 2750

Exhibit No. 263—Letter signed by John F. Conklin, Lt. Col., Corps of Engineers, District Engineer, addressed to Kanawha Valley Power Company, "Kanawha River pool fluctuations resulting from operation of the Marmet and London hydroplants" 3576A 2750

Exhibit Nos. 264-A, B, C—Aerial photographs of New River from Hinton, W. Va. to Narrows, Va. (original exhibits) 3577 2752

Exhibit No. 265—Document on Report on Application for License, Federal Power Project No. 1175, West Virginia, to Chief of Engineers, U. S. Army, Washington, D. C., dated Feb. 24, 1932, at St. Louis, Mo. (changed to defense exhibit No. 525 as it was already in evidence) (original exhibit) 3577 2752

Record from D. C. U. S., etc.—Continued.
Plaintiff's exhibits—Continued. Original Print
Exhibit No. 266—Dated March 12, 1932, informal comment upon the report of the United States Division Engineer at St. Louis, Feb. 24, 1932, on application of Kanawha Valley Power project No. 1175, West Virginia, by F. W. Scheidenhelm, consulting engineer for applicant (original exhibit)..... 3577 2752
Exhibit No. 271—Copy of protest to A. E. P. Co. against application of town of Galax, Va., for grant and loan from Government for construction of municipal hydro and diesel engine power plant and distribution system (original exhibit)..... 3577 2753
Exhibit No. 272—Letter dated April 9, 1932, from George Otis Smith to Mr. Thompson (original exhibit)..... 3578 2753
Exhibit No. 273—Book of aerial photographs of New River, W. Va., Va., and N. C. (original exhibit)... 3578 2753
Exhibit No. 274—An Act approved May 6, 1887, incorporating the New River Steam Boat Company, and authorizing them to operate a steam boat on New River (original exhibit)..... 3578 2753
Exhibit No. 275—Act of February 3, 1888, of the General Assembly of Virginia, to authorize the Radford Land and Improvement Company to erect a dam across New River (original exhibit)..... 3578 2753
Defendant's exhibits:
Exhibit Nos. 500-504—Discharge hydrographs, a wave study of New River (original exhibits)..... 3579 2753
Exhibit No. 505—Document dated May 9, 1927, New River Development Company—Record for minutes (original exhibit)..... 3579 2753
Exhibit No. 506—Copy of 7th Annual Report of the Federal Power Commission 1927 (original exhibit). 3579 2753
Exhibit No. 507—Gage recorder chart of Kanawha River at Kanawha Falls, W. Va., for the period July 6 to 13, 1936, incl. (original exhibit)..... 3579 2753
Exhibit No. 509—House Doc. No. 190, 70th Congress, 1st Session (original exhibit)..... 3579 2754
Exhibit No. 510—Letter dated Feb. 5, 1927 from Major H. M. Trippe to F. W. Scheidenhelm (original exhibit)..... 3579 2754
Exhibit No. 511—Letter dated February 4, 1927 from F. W. Scheidenhelm to Major H. M. Trippe (original exhibit)..... 3579 2754
Exhibit No. 512—House Doc. No. 91, 74th Congress, 1st Session (original exhibit) (same as exhibit 145, a part of which is set forth at fol. 3419 herein)..... 3579 2754
Exhibit No. 513—Chart—Power Waves on New and Kanawha Rivers (original exhibit)..... 3579 2754

Record from D. C. U. S., etc.—Continued.
Defendant's exhibits—Continued. Original Print
Exhibit No. 514—Letter dated October 20, 1931, from F. B. Duis to F. W. Scheidenhelm re pool levels on Kanawha River (original exhibit) 3580 2754
Exhibits Nos. 515-517, inclusive—Photographs of certain sections of New River (original exhibits) 3580 2754
Exhibit No. 518—Dublin, Va., W. Va., U. S. G. S. Quadrangle sheet 3580A 2754
Exhibit No. 519—Scarborough's New Census Map of Virginia, West Virginia, Maryland, Delaware, and District of Columbia (original exhibit) 3580B 2754
Exhibit No. 520—Map entitled "The Middle Atlantic Group comprising Virginia, West Virginia, Maryland, Delaware, and District of Columbia," published by National Power Survey (original exhibit) 3580B 2755
Exhibit No. 521—Map of Virginia, Maryland, Delaware, and District of Columbia, published by National Map Co., Indianapolis, Indiana (original exhibit) 3580B 2755
Exhibit No. 522—Randall McNally Map of Virginia (original exhibit) 3580B 2755
Exhibit No. 523—Map entitled "Commonwealth of Virginia, State Highway System, State Highway Commission, July 1936" (original exhibit) 3580B 2755
Exhibit No. 524—Map of Giles County, Commonwealth of Virginia, Department of Highways, Richmond, Va. (original exhibit) 3580B 2755
Exhibit No. 525—Copy of a report on application for license, Federal Power Project No. 1175, W. Va., dated Feb. 24, 1932 (original exhibit) 3580B 2755
Exhibit No. 526—Photograph of Shumate Falls (original exhibit) 3581 2755
Exhibit No. 527—Map dated 11/21/1912. Reconnaissance Map of New River from Hinton, W. Va., to Radford, Va., compiled under direction of Major F. W. Alstaetter. (Same as original exhibit 558-G) 3581 2755
Exhibit No. 528—Report of Major Craighill, Corps of Engineers, U. S. A. dated April 17, 1891 3583 2755
Exhibit No. 529—Letter dated February 4, 1930, addressed to Federal Power Commission, signed Appalachian Electric Power Company, by Curtis, Mallet-Prevost, Colt & Mosle 3589 2760
Exhibit No. 530—Memorandum, re Federal Commission's authority to adopt a policy of issuing a minor part license for projects located on non-navigable streams and not involving the use of any land or other property of the United States, dated February 4, 1930 3589C 2762

Record from D. C. U. S., etc.—Continued.
Defendant's exhibits—Continued. Original Print
Exhibit No. 531—Photostatic copy of letter dated July 21, 1930, addressed to Attorney General of United States and signed Patrick J. Hurley, Secretary of War 3589LL 2779
Exhibit No. 532—Document dated September 22, 1930, addressed to the President and signed by Wm. D. Mitchell, Attorney General. "The following opinion of the Attorney General was released by the Federal Power Commission, Sept. 26, 1930." 3589PP 2781
Exhibit No. 533—Letter of October 6, 1930, to Federal Power Commission signed Appalachian Electric Power Company, by Curtis, Mallet-Prevost, Colt & Mosle 3589YY 2787
Exhibit No. 534—Photostat copy of letter of October 16, 1930, to Federal Power Commission, signed—A. E. P. Co. by Curtis, Mallet-Prevost, Colt & Mosle (original exhibit) 3589ZZ 2788
Exhibit No. 535—Letter dated November 7, 1930, from War Department, Office of Chief of Engineers, to F. P. C. Exec. Secy. signed for Chief of Engineers by Major J. J. Kingman 3589AAA 2788
Exhibit No. 536—Letter dated October 31, 1930, from F. E. Bonner to A. E. P. Co. re Project No. 739 (original exhibit) 3589BBB 2789
Exhibit No. 537—Letter from F. P. C. to A. E. P. Co., dated November 6, 1930, signed by F. E. Bonner, Executive Secretary, and revised draft of minor-part license 3589CCC 2789
Exhibit No. 538—Photostatic copy of letter of November 8, 1930, to General Brown, Chief of Engineers, and signed by F. E. Bonner, Executive Secretary .. 3590 2790
Exhibit No. 539-A—Letter by Federal Power Commission of December 15, 1930, signed by F. E. Bonner, Executive Secretary to Curtis, Mallet-Prevost, Colt & Mosle (original exhibit) 3590A 2795
Exhibit No. 539-B—"Inclosure 7992, from Federal Power Commission, U. S. Government Printing Office 1927." Marked copy. War Department office of Chief of Engineers, Washington, 11/11/1930, addressed to Federal Power Commission, signed "Lytle Brown, Major General, Chief of Engineers" . 3592 2795
Exhibit No. 540-A—Letter dated 11/28/1930 from F. E. Bonner, Exec. Secy. of F. P. C. to A. E. P. Co. (original exhibit) 3593 2796
Exhibit No. 540-B—Certified copy of action of the Federal Power Commission upon application of the defendant for Minor Part license (original exhibit) . 3593 2796

Record from D. C. U. S., etc.—Continued.

	Original	Print
Defendant's exhibits—Continued.		
Exhibit No. 541—Memorandum dated October 28, 1930 for the Exec. Secy., signed M. C. Tyler, Lt. Col. Corps of Engineers, Chief of Engineers	3593A	2796
Exhibit No. 542—Copy of letter dated 11/8/1930 to F. E. Bonner from F. W. Scheidenhelm	3593L	2806
Exhibit No. 543—"Maneuvers of dams on Kanawha River during wave test, 1930" (original exhibit)	3593M	2806
Exhibit No. 544—"Report of Power Waves, New and Kanawha Rivers" (original exhibit)	3593M	2807
Exhibit No. 545—Location map	3593N	2806A
Exhibit No. 546—Certificate for W. R. Hundly, East Radford, Va. (omitted)	35930	2807
Exhibit No. 547—Four pages; namely, page 848 of the Congressional Record for January 10, 1901; page 1001 of the Congressional Record for January 14, 1901; page 1002 of the Congressional Record for January 14, 1901; and page 1096 of the Congressional Record for January 16, 1901	3595	2807
Exhibit No. 548—Map—"Railroads in relation to New River"	3603	2812A
Exhibit No. 549—Album of photographs (original exhibit)	3605	2813
Exhibit No. 550—Map "Geological Map of the New River, Cripple Creek region, showing the approximate location of ore openings and properties tributary to the Cripple Creek Extension of the Norfolk and Western Railroad, by E. N. D'In-Villiers, Geologist, 1887" (original exhibit)	3605	2813
Exhibit No. 551—Letter addressed to Dr. J. E. Williams, Dean at V. P. I., Blacksburg, Va., dated February 2, 1936, and signed by R. J. Noell (original exhibit)	3605	2813
Exhibit No. 552—Carbon copy of a letter dated March 2, 1926, addressed to Hon. R. J. Noell, East Radford, Virginia, and without signature except "Dean of the College" and bearing the initials "JEW" (original exhibit)	3605	2813
Exhibit No. 553—Letter dated March 4, 1936, from R. J. Holden, Professor, of Virginia Polytechnic Institute, Department of Geology, Blacksburg, Virginia, addressed to Hon. R. J. Noell, East Radford (original exhibit)	3605	2813
Exhibit No. 554—Album, together with the identification map and the 60 photographs of New River (original exhibit)	3605	2814
Exhibit No. 555—Map showing locations of photographs, and photographs Nos. 114 to 127, inclusive, of New River (original exhibit)	3605	2814

Record from D. C. U. S., etc.—Continued.
Defendant's exhibits—Continued. Original Print
Exhibit No. 556—Annual report of the President and Directors of the Board of Public Works to the General Assembly of Virginia, in pursuance of an act, entitled "An act creating a fund for internal improvements" (original exhibit) 3605 2814
Exhibit No. 557—Pages 140 and 141 of the Journal of the Virginia House of Delegates for 1817–18 containing a portion of the report of the House Committee on roads and inland navigation brought in on January 21, 1818 (original exhibit) 3605 2814
Exhibit Nos. 558–A–558–G—Map dated November 21, 1912, survey made by Major F. W. Alstaetter, Corps of Engineers. Sheets 1 to 7, inclusive, of the Alstaetter map dated November 21, 1912, marked, respectively, 558–A to 558–G (original exhibits) 3606 2814
Exhibit No. 559—Pages from the Report of the Chief of Engineers for 1875 3606–A 2814
Exhibit No. 560—Report of Chief of Engineers, 1887 3607 2823
Exhibit No. 561—Report of the Chief of Engineers for the year 1888, pages 225, 226, 1760, 1761 (original exhibit) 3612 2832
Exhibit No. 562—Report of the Chief of Engineers for the year 1889, pages 261, 262, 1961, and 1962 (original exhibit) 3612 2832
Exhibit No. 563—Report of the Chief of Engineers for the year 1890, pages 235, 236, 2249, 2250, 2251 (original exhibit) 3612 2832
Exhibit No. 564—Report of Brigadier General Casey, Chief of Engineers, United States Army, to the Secretary of War, dated November 16, 1894, to which is attached a third endorsement by Col. Craighill's underlying report, and also a second endorsement 3614 2832
Exhibit No. 565—Letter from the Secretary of War dated Dec. 16, 1903, transmitting letter from Chief of Engineers including report made by him on New River 3618 2835
Exhibit No. 566—Memorandum to the Secretary of War by Gen. Black, Chief of Engineers, dated May 19, 1916 3623 2840
Exhibit No. 567—Page 1284 of the Annual Reports of the Chief of Engineers of the War Department, year 1917 (original exhibit) 3634 2849
Exhibit No. 568—Copy of letter dated July 1, 1925, addressed to Mr. C. Bascom Slemp, and signed by O. C. Merrill, Executive Secretary of Federal Power Commission 3634–A 2849

Record from D. C. U. S., etc.—Continued.
Defendant's exhibits—Continued.

	Original	Print
Exhibit No. 569—Letter dated July 3, 1925, addressed to Honorable O. C. Merrill, Exec. Secy., F. P. C., Washington, D. C. and signed by C. B. Slemp (original exhibit)	3634–B	2850
Exhibit No. 570—Letter dated October 24, 1925, addressed to the Federal Power Commission, Washington, D C., and signed by Curtis, Mallet-Prevost, Colt and Mosle	3634–C	2850
Exhibit No. 571—Letter of October 24, 1925, addressed to Major General Harry Taylor, Chief of Engineers, War Department, Washington, D. C., signed by Curtis, Mallet-Prevost, Colt & Mosle, as counsel for the Appalachian Electric Power Co., or its predecessors	3634–D	2851
Exhibit No. 572—Report of Major General Taylor, Chief of Engineers, dated December 29th, 1925, addressed to the Executive Secretary of the Federal Power Commission, Washington, D. C. (text of this exhibit is same as Government Exhibit No. 97) (original exhibit)	3604–E	2851
Exhibit No. 573—"Defendant's Exhibit No. 505" identified by Col. Edgerton as a part of the minutes subsequently printed as the minutes of the meeting of June 1, 1927 (original exhibit)	3635	2851
Exhibit No. 574–A—Photostat of letter of July 1, 1927, from Federal Power Commission, addressed to Curtis, Mallet-Prevost, Colt & Mosle, signed by O. C. Merrill, Executive Secretary bearing reference "Ep–739–VA Appalachian Electric Power Company"	3635–A	2852
Exhibit No. 574–B—Certified copy of a part of the minutes of the 88th meeting of the Power Commission held on the first day of June 1927	3635–B	2852
Exhibit No. 574–C—"Federal Power Commission, Washington, D. C. License on Navigable Waters, Project No. 739, Virginia, Appalachian Electric Power Co." with it is a form of license consisting of 16 pages (original exhibit)	3635–C	2853
Exhibit No. 575—Letter dated March 1, 1928, to Hon. Dwight F. Davis, Secy. of War, Hon. Hubert Work, Secy. of Interior, Hon. Wm. N. Jardine, Secy. of Agriculture, constituting the Federal Power Commission, and signed A. E. P. Co., by Curtis, Mallet-Prevost, Colt & Mosle (original exhibit)	3635–D	2853
Exhibit No. 576—Letter dated March 5, 1930, to Lt. Col. M. C. Taylor, Chief Engineer, Federal Power Commission, Interior Building, Washington, D. C., and signed by F. W. Scheidenhelm (original exhibit)	3635–D	2854

Record from D. C. U. S., etc.—Continued.
Defendant's exhibits—Continued. Original Print
Exhibit No. 577—Photostatic copies of pages 6, 7, 8, and 9, of the Tenth Annual Report of the Federal Power Commission for the year 1930 3635-E 2854
Exhibit No. 578-A—Letter dated October 3, 1930, to Gen. Brown, Chief of Engineers, and signed by F. E. Bonner, Exec. Secy. (original exhibit) 3636 2857
Exhibit No. 578-B—Letter dated October 10, 1930, to the Exec. Secy., F. P. C., Washington, D. C., signed for the Chief of Engineers, by Hugh J. Casey, First Lieut. Corps of Engineers (original exhibit) 3636 2857
Exhibit No. 579-A—Photostatic copy of letter dated November 5, 1930, to Exec. Secy., F. P. C. and signed by Lytle Brown, Major General, Chief of Engineers 3638 2857
Exhibit No. 579-B—Photostat of report entitled "Second endorsement U. S. E. O. Huntington, W Va., Oct. 18, 1930, Div. Engineer, Upper Miss. Valley Division, St. Louis, Mo., signed by Major Herman, District Engineer." 3638 2857
Exhibit No. 579-C—Photostat copy of report on navigability of New River, Va. (Huntington District, August 29, 1930). Third endorsement, office, Division Engineer, Upper Miss. Valley Div., St. Louis, Mo., October 24, 1930, to Chief of Engineers, U. S. Army, Washington, and signed George R. Spalding, Lt. Col. Corps of Engineers 3638 2857
Exhibit No. 580—Memorandum dated October 21, 1930, entitled "Memorandum for Exec. Secy." and signed by J. F. Lawson, acting Chief Counsel (original exhibit) 3647 2865
Exhibit No. 581—Document dated October 30, 1930, entitled "Memorandum for the Sec. of Int., Acting Chairman," and signed by F. E. Bonner, Exec. Sec 3647-A 2865
Exhibit No. 582—Photostatic copy of letter dated November 8, 1930, to Hon. John G. Pollard, Gov. of Va., and signed by F. E. Bonner, Exec. Sec 3647-C 2866
Exhibit No. 583—Photostat of letter from Hon. John Pollard, Gov. of Va., to Mr. F. E. Bonner, Exec. Sec., F. P. C., dated Nov. 10, 1930 3647-D 2867
Exhibit No. 584—Letter Jan. 27, 1931, from Curtis, Mallet-Prevost, Colt & Mosle to F. P. C. re Project #739 (original exhibit) 3647-E 2867
Exhibit No. 585—Telegram dated January 28, 1931, from F. P. C., signed by George Otis Smith, Chairman, addressed to A. E. P. Co. (original exhibit) 3647-E 2867
Exhibit No. 586—Photostat of letter dated September 18, 1934, to Sec. of War, Washington, D. C., and signed by A. E. P. Co., by George N. Tidd, President 3647-F 2868

Record from D. C. U. S., etc.—Continued.
Defendant's exhibits—Continued. Original Print

Exhibit No. 587—Photostatic copy of letter dated October 9, 1934, to A. E. P. Co. and signed by G. H. Dern, Secy. of War 3647-I 2871
Exhibit No. 588—Letter dated October 18, 1934, to Hon. George H. Dern, Sec. of War, and signed by George N. Tidd, President A. E. P. Co 3648 2871
Exhibit No. 589—Letter dated September 18, 1934, to Hon. Frank R. McNinch, Chairman, F. P. C., signed by Appalachian Electric Power Company, by George N. Tidd, President (original exhibit) .. 3648-B 2873
Exhibit No. 590—Letter dated October 19, 1934 to Frank R. McNinch, Chairman, F. P. C., without signature but counsel for both sides agreed that it was signed by M. F. Millikan, General Counsel of the Company (original exhibit) 3648-B 2873
Exhibit No. 591—Photostatic copy of letter to M. F. Millikan, American Gas and Electric Company, signed by G. W. Dineweaver, Secretary, Federal Power Commission, dated October 23, 1934 (original exhibit) 3648-B 2873
Exhibit No. 592—Map showing locations of certain photographs from 61 to 113, both inclusive, of New River (original exhibit) 3648-B 2873
Exhibit No. 593—Paper on which Prof. Thomas drew sketch of wave 3648-D
Exhibit No. 594—Hydrograph representing a possible hydrograph of operation of the A. E. P. Co. plant during a rather severe peak load operation, showing the discharge from the plant in cubic feet per second at various hours of the day 3649 2874A
Exhibit No. 595—Chart showing a wave drawn during presentation of testimony of Prof. Thomas 3651
Exhibit No. 596—Diagram of triangular wave prepared by Prof. Thomas 3651-A 2874B
Exhibit No. 597—Diagram by Prof. Thomas pertaining to principle of integrating model 3651-B 2874C
Exhibit No. 598—Diagram by Prof. Thomas showing reduction of Waves 3651-C 2874D
Exhibit No. 599—Chart upon which Dr. Mead made diagram in connection with his testimony, pertaining to stream flow (original exhibit) 3651-D 2874
Exhibit No. 600—Chart bearing legend, "Profile New and Kanawha Rivers to Forks of New River and North Carolina to Ohio River, showing existing and and proposed power developments" 3652 2874E

Record from D. C. U. S., etc.—Continued.
Defendant's exhibits—Continued. Original Print

Exhibit No. 601—House Document No. 306, 74th Congress, First Session, entitled "Ohio River, letter from the Sec. of War transmitting, pursuant to Section 1 of the River and Harbor Act approved January 21, 1927, and Section 10 of the Flood Control Act, approved May 15, 1928, a letter from the Chief of Engineers, United States Army, dated August 14, 1935, submitting a report, together with accompanying papers and illustrations containing a general plan for the improvement of the Ohio River for the purposes of navigation and efficient development of its water power, the control of floods, and the needs of irrigation" (original exhibit) 3654 2874

Exhibit No. 602—This exhibit is the Table 45, Appendix A, referred to in the paragraph 263, page 146, of exhibit 601. The appendices to the reports otherwise embodied in House Document No. 306 (being exhibit 601) were not printed as part of that document (original exhibit) 3654-A 2874

Exhibit No. 603—Photostat of cover page of document entitled "The Ohio River Chart, drawings and description of features affecting navigation, navigable depths and tables of distances for its tributaries, compiled under the direction of the Chief of Engineers, United States Army," and also photostat of page 267 of that document (original exhibit) 3654-B 2874

Exhibit No. 604—Copy of letter dated June 13, 1936, from Mr. Baker to the late Sec. of War, Mr. Dern (original exhibit) 3654-C 2874

Exhibit No. 605—Reply of S. D. Embick, Acting Secretary of War, to Mr. Baker, dated June 22, 1936 (original exhibit) 3654-C 2874

Exhibit No. 606—Letter dated June 26, 1936, from Hon. John Paul to Secretary of War (original exhibit) 3654-C 2875

Exhibit No. 607—Letter dated July 17, 1936, to the Hon. John Paul, from Mr. Woodring, Acting Sec. of War (original exhibit) 3654-C 2875

Exhibit No. 608—Letter dated June 26, 1936, from Col. Conklin, addressed to the Kanawha Valley Power Company (original exhibit) 3655 2875

Exhibit No. 609—Letter dated July 10, 1936, to U. S. District Engineer Office, Huntington, W. Va., signed by Kanawha Valley Power Company, Graham Claytor, Vice President, subject "Kanawha River Pool Fluctuations resulting from operation of the Marmet and London Hydroplants" 3655-A 2875

	Original	Print
Record from D. C. U. S., etc.—Continued.		
Defendant's exhibits—Continued.		
Exhibit No. 610—Letter dated July 28, 1936, from the War Dept., United States Engineer Office, Huntington, W. Va., addressed to Col. F. W. Scheidenhelm, and signed by John F. Conklin, Lt. Col., Corps of Engineers, District Engineer (original exhibit)	3655–C	2877
Exhibit No. 611—Executive Order No. 6251, dated Aug. 19, 1933 (set forth in full at fol. 2900 hereof)	3655–D	2877
Memorandum required by Rule 14, Section 7	3656	2877
Clerk's certificate [omitted in printing]	3657	
Proceedings in the United States Circuit Court of Appeals for the Fourth Circuit	3658	2878
Docket entries	3658	2878
Appearance for appellee	3658	2878
Appearance for appellant	3658	2878
Argument of cause	3660	2880
Opinion, Chesnut, J	3661	2880
Dissenting Opinion, Parker, J	3718	2922
Decree	3745	2943
Order staying mandate	3745	2943
Order as to use of original transcript of record	3747	2944
Clerk's certificate [omitted in printing]	3748	2944
Order allowing certiorari	3749	2944
Stipulation as to printing of record	3750	2945

1 [Caption omitted.]

[File endorsement omitted.]

2 In United States District Court for the Western District of Virginia

In Equity No. 8

UNITED STATES OF AMERICA, APPELLANT

vs.

APPALACHIAN ELECTRIC POWER COMPANY, A CORPORATION, APPELLEE

Praecipe for transcript of record

Filed Feb. 24, 1939

To the CLERK OF THE ABOVE COURT:

Appellant and appellee having agreed upon the contents of this praecipe, you are hereby requested to disregard the several praecipes heretofore filed, and to include in the transcript of record to be filed in the United States Circuit Court of Appeals for the Fourth Circuit the following, and no other documents, to wit:

(1) Writ of subpoena.
(2) Bill of complaint, as amended.
(3) Answer of defendant, as amended.
(4) Order of September 19, 1935.
(5) Petition of the State of Virginia for leave to appear as amicus curiae.
(6) Petition of the State of West Virginia for leave to appear as amicus curiae.
(7) The sworn motion for taking depositions filed on the 26th of August 1936.
(8) The order of August 26, 1936, on the motion last aforesaid.
(9) Plaintiff's requested findings of fact and conclusions of law.
(10) Opinion of the court filed April 22, 1938.
(11) Findings of fact and conclusions of law.
(12) Final decree and order granting exceptions.
(13) Assignment of errors, as amended.
(14) Statement of Evidence under Equity Rule 75.
3 (15) Stipulation as to printing record on appeal under Rule 23.
(16) Stipulation as to sending up original exhibits.

(17) Order of February 2, 1939, directing the Clerk to transmit all original exhibits which are not copied in full in the approved statement of evidence.

(18) Approval by District Judge of statement of evidence.

(19) Original exhibits not copied in full in the approved statement of evidence.

(20) Memorandum under Section 7 of Rule 14.

(21) This praecipe.

(22) Clerk's certificate.

In addition to the foregoing you are requested to transmit the following documents which are not to appear in the printed record on appeal:

(a) Stipulation of July 8, 1936, relating to the admissibility in evidence of copies of certain documents.

(b) Stipulation signed by counsel dated September 14, 1938.

(c) Appellee's objections and proposed amendments to appellant's statement of evidence, filed February 1, 1939. (Original)

(d) Order entered on February 2, 1939, allowing appellee's objections and proposed amendments, as modified, to appellant's statement of evidence.

(e) Order entered on February 2, 1939, granting appellant an exception to the order allowing appellee's objections and proposed amendments, as modified, to appellant's statement of evidence.

(Signed) JOSEPH H. CHITWOOD,
Joseph H. Chitwood,
United States Attorney,

(Signed) JOHN W. AIKEN,
John W. Aiken,
Special Assistant to the Attorney General,
Of Counsel for Appellant.

(Signed) WENDELL W. FORBES,
Of Counsel for Appellee.

4 United States of America, Western District of Virginia

Equity subpoena

[File endorsement omitted.]

Filed May 14, 1935

The President of the United States of America to the Marshal of the Western District of Virginia, Greeting:

You are hereby commanded to summon Appalachian Electric Power Company, a Corporation, if it be found in your district, to

be and appear in the United States District Court for the Western District of Virginia, at Lynchburg, Virginia, on or before the twentieth day after service hereof, excluding the day of service, to answer a certain bill in equity, filed and exhibited in said court by The United States of America.

Make return how you have executed this writ and the time or times of service on the 29th day of May 1935. Hereof you are not to fail, under penalty of the law thence ensuing. And have you then and there this writ.

Witness the Honorable John Paul, Judge of the United States District Court for the Western District of Virginia, this 9th day of May 1935.

Attest: C. E. GENTRY,
Clerk.

[SEAL] By (Sgd.) LOUIS H. PRICE,
Deputy Clerk.

A Copy—Teste:

_____,
Deputy Clerk.

MEMORANDUM

The above-named defendant is required to file answer or other defense in the Clerk's Office of the above-named court at Lynchburg, Virginia, on or before the twentieth day after service of this writ, excluding the day of service; as otherwise the above-mentioned bill may be taken pro confesso.

Executed this Subpoena on May 13th, 1935. On the Appalachian Electric Power Co., A Corporation, By delivering a copy in writing thereof to Mr. W. I. Whitfield, Manager of the within-named Corporation, at the principal office of the above-named corporation at Roanoke, Va. A place within my district.

JOHN W. STUART,
U. S. Marshal,
Western District of Virginia.
By (Sgd.) B. Y. HARRIS,
Deputy.

Original. Equity No. 8. Equity subpoena. United States District Court at Lynchburg, Virginia. In equity the United States of America vs. Appalachian Electric Power Co., Inc. To the Marshal: Make return of service hereof on the 29th day of May 1935.

"The service of all subpoenas shall be by delivering a copy thereof to the defendant personally, or by leaving a copy thereof at the dwelling house or usual place of abode of each defendant

with some Adult person who is a member of or resident of the family." Equity Rule 13. Filed May 14th, 1935. C. E. Gentry, Clerk. By (Sgd.) Louis H. Price, Deputy.

5 In United States District Court for the Western District of Virginia

[File endorsement omitted.]

In Equity #8

THE UNITED STATES OF AMERICA, PLAINTIFF

vs.

APPALACHIAN ELECTRIC POWER COMPANY, A CORPORATION, DEFENDANT

Bill of complaint

Filed May 8, 1935

To the HONORABLE JUDGE OF THE DISTRICT COURT OF THE UNITED STATES, WESTERN DISTRICT OF VIRGINIA.

Now comes the United States of America, by Joseph H. Chitwood, United States Attorney for the Western District of Virginia, acting by the authority and under the direction of the Attorney General of the United States, and brings this its bill of complaint against the Appalachian Electric Power Company, a corporation, and thereupon complainant avers:

I

(1) The ground for the jurisdiction of this Court is that the United States is the plaintiff herein.

(2) That the defendant, Appalachian Electric Power Company, is a public service corporation duly organized and existing under the laws of the State of Virginia, with its principal place of business in the City of Roanoke, Virginia, in the Western District of Virginia.

(3) Plaintiff avers that on or about June 1, 1934, the defendant, Appalachian Electric Power Company, without having obtained any permit, license, or authority from plaintiff or any agent of plaintiff, began constructing a dam in and across the New River, near Radford in Pulaski County, Virginia, for the purpose of impounding the waters thereof and of utilizing the same for gen-

erating hydroelectric power for use and sale in public service, and is now unlawfully constructing the same. The said
6 project is hereinafter designated as the defendant's Radford project.

(4) Plaintiff avers that New River is a navigable interstate stream arising in North Carolina and flowing in a northerly and northwesterly direction across the State of Virginia, into West Virginia, to the injunction of Gauley River and New River, from which point it becomes known as the Kanawha River; that below the confluence of the New and Gauley Rivers the stream continues in a northwesterly direction and discharges into the Ohio River at Point Pleasant, West Virginia; that the said New River and Kanawha River together constitute one continuous stream; that plaintiff, by means of its agencies, the Corps of Engineers of the War Department, the United States Geological Survey, and the Federal Power Commission, has made many surveys of the New and Kanawha Rivers, and for many years has kept records showing the flow thereof; that at Kanawha Falls, West Virginia, the stream had a maximum discharge of 270,000 cubic feet per second in 1878 and a minimum average discharge for any one day of 841 cubic feet per second on October 8, 1930; that the lowest flow of record at Kanawha Falls, West Virginia, was 640 cubic feet per second and occurred on August 15, 1930, but the average flow for that day was greater than for October 8, 1930; that at Kanawha Falls during the years of record the mean of the annual maximum flows is 118,000 cubic feet per second, and the mean of the annual minimum flows is 1,850 cubic feet per second; that defendant proposes to install, in its powerhouse, machinery having aggregate capacity of 104,000 horsepower in four units of 26,000 horsepower each; that the hydraulic capacity of said installation is approximately 9,000 cubic feet of water per second; that the flow of New River at defendant's Radford dam site is less than 9,000 cubic feet per second for more than 95 percent of the time; that the average flow of New River at defendant's dam site is 3,100 cubic feet per second, and the flow of the river at said site is less than said average flow for about 60 percent of the time; that in order to make use of the installed capacity, defendant must necessarily alternately impound and release
7 large volumes of water, thus causing substantial artificial variations of the stream flow at all discharges below 9,000 cubic feet per second, and very great percentage variations from the natural flow at discharges below the average flow.

(5) Plaintiff avers that defendant's proposed reservoir would have gross capacity of approximately 206,000 acre-feet, and utilizable storage capacity of 100,000 acre-feet in a draw-down of 27

feet below the normal maximum reservoir level; that with said utilizable storage capacity defendant would, in making full use of the installed machinery, interfere with the natural flow of the river more than 95 percent of the time, and could at will, during periods of low and moderate flow, impound the entire flow of the river continuously for many days; that during periods of low flow, i. e., critical periods from the viewpoint of navigation interests, the part of the New-Kanawha River watershed lying above the Radford dam site is more productive of run-off than the part of said watershed below said dam site; that during the extreme low-water month of October 1930, 70 percent of all the water that pased the Kanawha Falls, West Virginia, gage and flowed into the canalized section of the Kanawha River, came from the drainage area above defendant's dam site; that during the low-water month of September 1902, 76 percent of all the water that passed the Kanawha Falls, West Virginia, gage came from the drainage area above defendant's dam site; that, in contrast, only 29 percent of the drainage area above the Kanawha Falls, West Virginia, gage lies above defendant's dam site.

(6) Plaintiff avers that, in improving the New River for the purpose of making it more suitable for use in interstate commerce, plaintiff actually improved the 26½-mile interstate stretch of said river from Wileys Shoals, Virginia, to Hinton, West Virginia, and also actually improved the 29¼-mile stretch of said river extending upstream from New River bridge (near Radford) in which latter stretch defendant's dam, powerhouse, and reservoir will be wholly located; that if the Kanawha and New Rivers were in their natural condition, in which condition they were navigable waters of the United States, the impounding of the flow in defendant's
8 reservoir would render navigation impossible on said streams during periods of low and moderate flow; that the impounding of water in defendant's reservoir during periods of low and moderate flow would make navigation impossible on the New River as improved by the plaintiff, and would impair navigation on the canalized section of the Kanawha River, and thus menace plaintiff's investment of approximately $25,000,000 in navigation improvements on the Kanawha and New Rivers.

(7) Plaintiff avers that in June 1932, the defendant filed with the State Corporation Commission, Commonwealth of Virginia, an application for a license to construct said project on New River just above the mouth of Little River, and that in October 1932 the State Corporation Commission issued a license to the defendant, substantially in accordance with the general and preliminary maps, plans, and specifications set forth in said application and in the exhibits filed therewith; that under the terms of said license the defendant purports to have the right to impound, as it sees fit,

the entire flow of the New River in said reservoir, at such times as the discharge of Little River, just below defendant's dam site, shall exceed 25 cubic feet per second and average 77 cubic feet per second for a 24-hour period, or average 221 cubic feet per second for a 7-day period; that the natural flow of Little River is always in excess of 25 cubic feet per second and exceeds 77 cubic feet per second for more than 99 percent of the time, and exceeds 221 cubic feet per second for 72 percent of the time.

(8) Plaintiff further avers that below the Radford project site plaintiff has erected ten dams in the Kanawha River for the purpose of improving navigation in said river; that said Kanawha River is a navigable river of the United States; that by the Rivers and Harbors Act of July 3, 1930 (46 Stat. 928), Congress authorized the War Department to construct those two certain dams known as the London and Marmet Dams in the said river "in accordance with the report submitted in House Document No. 190, 70th Congress, First Session, and with a view to providing a channel nine feet in depth and two hundred feet in width"; that said

9 Act was passed as a result of and to carry out the recommendations contained in a report of the Chief of Engineers contained in said House Document No. 190, 70th Congress, First Session, which said report informed Congress in substance that by constructing locks, dams, and power plants at the London and Marmet dam sites, navigation could be improved and revenue could be realized through the production of hydroelectric power which would in large part pay the expenses of construction and operation of the said dams, and also that the London and Marmet dams would take the place of the four uppermost Government dams then needing repairs; that plaintiff has adopted a plan recommended by the Secretary of War, as shown in House Document No. 31, of 73d Congress, First Session, providing for a nine-foot channel depth on the Kanawha River from the Ohio River to Kanawha Falls; and for the construction of a dam at Winfield, West Virginia, in the Kanawha River, and a dam in the Ohio River near Gallipolis, Ohio; that the six existing Government dams situated in the said river below the Marmet dam at this time are built with a concrete base and a movable crest with gates that stay closed (upright) at normal flow of the river, but which must be opened (lowered) when the flow reaches a certain volume and must then be closed by mechanical means whenever the flow recedes, in order to maintain the pool levels; that the said London and Marmet dams are being constructed with a concrete base with crest gates of the roller type which must be operated mechanically to control the pool levels.

(9) Plaintiff avers that said New River from Wilson Creek, Virginia, north and west to the Kanawha River in West Vir-

ginia, including the point at which the defendant, the Appalachian Electric Power Company, is now constructing the said Radford project, was in its natural condition, and is in its improved condition navigable waters of the United States; that in such natural condition it was, and still is, capable of use by the public for purpose of navigation and that by virtue of its connection with the Kanawha and Ohio Rivers it formed and forms a highway capable of being used for purposes of interstate and foreign commerce; that any obstructions to the navigability of said river arising from shallow places and rapids in the river or otherwise, where portages may be necessary, were and are capable of being removed and overcome by the improvement of said river; that on the lower portion of said waterway such improvements have been initiated, and are now in course of construction and that pending such improvements said New River and said Kanawha River irrespective of said shallow places and rapids are to be deemed navigable and to constitute one connected highway of interstate and foreign commerce subject to the care and protection of the plaintiff; and that any artificial obstructions erected or placed therein, without the consent, supervision, and control of the plaintiff are in violation of law.

(10) The plaintiff further avers that said New River has been recommended to Congress for improvement after investigation under its authority (Act of June 10, 1872; Act of July 2, 1874; Annual Reports of Chief of Engineers, 1875, page 631) by connecting the New and Kanawha Rivers with the James River as follows: by means of a series of locks, dams and canals to improve navigation on New River from the pool above Kanawha Falls to Hinton, West Virginia, thence through the Greenbrier River to a point where a canal was recommended connecting the said Greenbrier River with Jackson River, a tributary of the James River, at a point near Covington, Virginia; that a waterway could thus be developed whereby commerce from the Mississippi and Ohio Rivers could move through the Kanawha and up the New River and the Greenbrier, and thence by canal to the James River, and down the James River to the Atlantic Ocean; that by this means of connecting the said James and Kanawha Rivers, the New River, including the parts above and below Radford, would be made a useful part of the system of navigable waters of the United States; and that any difficulties arising on account of the rapids in said river are capable of being overcome through the improvement of said river by locks, canals, and dams.

(11) Plaintiff further avers New River has always been recognized and treated by the plaintiff and by the States of Virginia and West Virginia as navigable; that Congress has recognized and never abandoned navigability of said river; that the United

States Geological Survey, an agency of the plaintiff duly authorized by Congress, for many years has recommended and approved the purchase of lands under the Weeks' Act (16
11 U. S. C. 513–519) for the purpose of improving navigation by reforestation of the upland within the watershed of New River, thus preventing erosion and the deposit of silt in the channels of New and Kanawha Rivers (United States Geological survey reports, numbers 30 and 34); that Congress has appropriated money for, and plaintiff through the National Forest Reservation Commission and the Secretary of Agriculture, has purchased approximately 54,000 acres of such lands in the Unaka National Forest and is reforesting them and pursuing the policy of acquiring additional lands in said area; that the Chief of Engineers of the United States Army from 1873 up to 1913, pursuant to numerous acts of Congress, made surveys of said river from the mouth of Wilson Creek in Virginia, to Hinton, West Virginia, and reported the same as navigable and as actually carrying useful commerce; that Congress, acting upon the official recommendation of its engineers, appropriated, during the years 1876 to 1886, inclusive, a total of $112,000 for the improvement of navigation on New River; that said appropriations were expended under direction of the Chief of Engineers for the purpose and with the effect of improving said river for navigation from points in Virginia to points in West Virginia, including that part of the river in which the Radford porject is being constructed; that the channels through shoal places cut in the rocks to connect the long pools in said river are still in existence within the area of the Radford project and, while not now extensively used by reason of railroad competition and competition of commodities in other regions with the commodities here to be moved, are capable of use at this time and that any accumulation of silt therein could be easily removed; that in 1872 a Board of Engineers, acting under the authority of Congress, reported that a canal and waterway utilizing and joining the James and New Rivers would be economically and physically feasible and recommended a series of dams in the stretch of New River between Hinton, West Virginia, and the mouth of the Gauley River; that Congress by many special statutes has recognized the New River as navigable.

(12) The plaintiff further avers that the General Assembly of the State of Virginia by Act of February 15, 1812, created
12 a Commission to make investigation for the purpose of ascertaining the feasibility of connecting the navigable waters of the New, Kanawha, and James Rivers by means of a canal between the Jackson River near Covington, and the Greenbrier, a tributary of New River; that John Marshall, then Chief

Justice of the United States, was appointed to head said Commission, and that after making the trip by boat with the other Commissioners down the Greenbrier to Hinton, West Virginia, and by the same boat to Kanawha Falls, he reported the said New River navigable and that improvements were practicable to make New River a useful part of a waterway between the eastern part of Virginia and the Ohio River, and he favorably recommended the canal project to the General Assembly; that Acts of the Assembly of the State of Virginia, February 24, 1823, and March 2, 1855, provided State aid to a corporation formed by the State, for the purpose of constructing the James River-Kanawha Canal; and the Acts of February 12, 1872, and December 19, 1872, bespeak the aid of the State of West Virginia and of plaintiff in said enterprise.

(13) Plaintiff further avers that the legislative acts of the State of Virginia from earliest times to the present recognize the navigability of New River; that by Act of the Assembly of December 13, 1861 (Laws of Virginia 1861–1862, page 72), $30,000 was appropriated and expended for the improvement of said New River from Central Depot near Radford, to Hinton; that the State of West Virginia has always recognized the navigability of New River throughout its course in that State and its Legislature by joint resolution of September 21, 1872 (Laws of West Virginia 1873–1874, page 751), memorialized Congress to improve the same and to construct the James River-Kanawha Canal, hereinbefore referred to; that the foregoing Acts of Congress and reports and Acts of the United States Government and of the States of Virginia and West Virginia have established the navigability of New River.

(14) Plaintiff further avers that upon various sections of New River above Hinton, including the section between Lead Mines and New River Depot, within which the Radford project is being constructed, an extensive commerce has been carried on; that the Kanawha River is in fact a continuation of the same stream called New River above the juncture with Gauley River,
13 and is navigable and extensively navigated from the Ohio River to Kanawha Falls; that in the part of New River from Hinton to the mouth of the Gauley River, as well as in other parts of said stream, there are certain falls, shoals, and rapids constituting interruptions between navigable sections of said stream; that said river has been investigated by the Chief of Engineers and by other engineers acting under authority of Congress and has after such investigation been recommended by them to Congress for improvement between Mouth of Wilson and

the Ohio River; and that said stream in the intervening part between navigable sections is, by the definition in paragraph 7, section 3 of the Federal Water Power Act (41 Stat. 1063; 16 U. S. C. 796) navigable waters of the United States.

(15) Plaintiff further avers that the defendant, Appalachain Electric Power Company, on or about June 1, 1934, began the construction of said Radford project within the limits of said New River, a navigable river of the United States, the construction of a dam to raise and store the waters of said river, the construction of the power house hereinbefore described; and has continued and is continuing said construction, and is preparing and threatening to operate said project; that the said dam will totally obstruct the said river and the operation of the said project in accordance with the plans of the defendant, will at times totally obstruct and retard the stream flow and at times leave the bed of New River practically dry in long stretches of said stream, so as to render navigation impossible thereon; that said acts have been performed without the consent of Congress, without any permit, permission, authority, or approval from the Secretary of War, or recommendation from the Chief of Engineers, without any license under the terms of the Federal Water Power Act, and without any authority from the plaintiff, and in violation of law, and particularly, in violation of Sections 9 and 10 of the River and Harbor Act of March 3, 1899 (33 U. S. 401, 403), and of the Federal Water Power Act of June 10, 1920 (16 U. S. C. 791–823).

14 II

(16) Plaintiff further avers that unless the plaintiff can control the operation of the artificial obstructions to the natural flow of the New and Kanawha Rivers at all of the various dams on the said rivers already constructed, in the process of construction, and planned for future construction, including the Radford project, the improvement of the said New and Kanawha Rivers for navigation as contemplated, undertaken, and partially completed by the plaintiff, will be injuriously affected and retarded and interfered with, and the defendant will be in a position to affect, and at times to prevent any navigation in those pools created in the said rivers by the plaintiff to improve navigation, as well as in parts of the said rivers not included in such pools; that in the operation of the Radford project the defendant, Appalachian Electric Power Company, will intermittently store and release large quantities of water in accordance with its needs and the requirements of a public service corporation whenever it is profitable to do so; that such

intermittent storage and release of the waters of New River at said Radford dam will set up fluctuations in the flow of New River which will be transmitted to all that part of the river and to the Kanawha River below the site of the Radford project; that said fluctuations so caused will alter and modify the condition and capacity of the channel of New and Kanawha Rivers and of the pools created by the plaintiff therein for the purpose of improving navigation, and will at times cause and create shoal places in said New and Kanawha River; that the construction of said Radford project was started and has been and is being continued by defendant; that the construction and operation of said Radford project will seriously obstruct, alter, and modify the course, condition, and capacity of the channel of the New and Kanawha Rivers, both of which are navigable waters of the United States; that construction of said Radford project has not been authorized by Congress, has not been recommended by the Chief of Engineers, and has not been authorized by the Secretary of War or any other agency of the plaintiff, either prior to beginning the same or at any time; and that the acts of the defendants are in violation of the laws of the United States relating to navigable waters and particularly in violation of Section 10 of the River and Harbor
15 Act of March 3, 1899 (33 U. S. C. 403).

(17) Plaintiff is informed and believes and, therefore, avers that, pursuant to the Water Power Act of the State of Virginia of 1928 (as amended in 1932) relating to control of waters in said State, the defendant, Appalachian Electric Power Company, being a local public service corporation of the said State, on or about June 1, 1932, filed with the Corporation Commission of said State its application for a project on New River, substantially identical in plan with the scheme of development proposed in the said declaration of intention adopted by the defendant and as filed by the Appalachian Electric Power Company with the Federal Power Commission; that on or about October 25, 1932, the said Corporation Commission of the State of Virginia entered its order granting said application to defendant, Appalachian Electric Power Company, for the said Radford project on New River and issued its license therefor, pursuant to said State statute. Plaintiff further avers that defendant is preparing, planning, and threatening to operate its project in accordance with the schedules authorized by said license from the State and plaintiff avers that the quantities of water required to be released and the method of operation prescribed by said State license will at times be inadequate to maintain navigability in the navigable parts of New and Kanawha Rivers below said Radford project.

III

(18) Plaintiff further avers that on or about the 26th day of June 1926, New River Development Company filed its Declaration of Intention with the Federal Power Commission pursuant to section 23 of the Act of June 10, 1920 (41 Stat. 1063, 16 U. S. C. 817), for the said Radford project, Virginia, which is the same project as the Radford project herein referred to. That the said Declaration describes the scheme of development and represents the purpose of the proposed Radford project to be that of supplying hydroelectric power for public-utility use. That the pertinent part of section 23 of said Federal Water Power Act is as follows:

"That any person, association, corporation, State, or municipality intending to construct a dam or other project works across,
16 along, over, or in any stream or part thereof, other than those defined herein as navigable waters, and over which Congress has jurisdiction under its authority to regulate commerce between foreign nations and among the several States, may in their discretion file declaration of such intention with the commission, whereupon the commission shall cause immediate investigation of such proposed construction to be made, and if upon investigation it shall find that the interests of interstate or foreign commerce would be affected by such proposed construction, such person, association, corporation, State, or municipality shall not proceed with such construction until it shall have applied for and shall have received a license under the provisions of this act. If the commission shall not so find, and if no public lands or reservations are affected, permission is hereby granted to construct such dam or other project works in such stream upon compliance with State laws."

(19) Plaintiff is informed and believes, and therefore avers that on or about the 2d day of September 1926, the said New River Development Company transferred its rights and obligations under said Declaration of Intention to construct the said Radford project to the defendant, Appalachian Electric Power Company; that the said defendant, Appalachian Electric Power Company, adopted the plans of said declarant and continued the presentation thereof to the Federal Power Commission.

(20) Plaintiff further avers that upon the filing of said Declaration of Intention the Federal Power Commission, as required by section 23 of the Federal Water Power Act, caused an investigation to be made, and having examined into the matter and studied the plans of the said defendant, held a hearing, giving full oppor-

tunity to the declarant, New River Development Company and its successor, the defendant, Appalachian Electric Power Company, to introduce evidence and be heard in argument, and the Commission at its meeting on June 1, 1927, considered the evidence and being fully informed in the premises, made its finding; the original finding and rehearing thereon are exhibited herewith and prayed to be read as a part hereof, being marked "Exhibit A."

(21) Plaintiff avers that ample evidence in support of said findings upon the rehearing was before the Federal Power Commission, was duly considered by the Commission, and was given effect in said findings on the rehearings and plaintiff avers the fact to be that the construction and operation of said project will in law and in fact affect the interests of interstate commerce on said New and Kanawha Rivers.

17 (22) Plaintiff is informed and believes and, therefore, avers that, notwithstanding the filing of said Declaration of Intention, and not withstanding the finding upon rehearing of the Federal Power Commission that the construction of said project would affect the interests of interstate and foreign commerce, the defendant, Appalachian Electric Power Company, began the construction of the said project works on or about June 1, 1934, and has prosecuted construction thereof, and is now preparing and threatening to operate the same; to cause great fluctuations in the volume of New River; and to interfere with the flow of water into the pools created by the navigation dams of the plaintiff, without any authority of law, in violation of law, and contrary to the finding of the Commission, and to the express provisions of section 23 of the Federal Water Power Act.

(23) Plaintiff avers that the said defendant, Appalachian Electric Power Company, having through its predecessor filed a Declaration of Intention under section 23 of the Federal Water Power Act and the Federal Power Commission having in response thereto made an investigation and finding that the proposed construction would affect the interests of interstate commerce, and the defendant, Appalachian Electric Power Company, having adopted said declaration and renewed the request for a finding, and further because of the fact that said construction does and the said operation will affect the interests of interstate commerce on the New and Kanawha Rivers, the said construction and operation as above particularly set out without license therefor from the Federal Power Commission, or authority of law, is a violation of law by the defendants and each of them and particularly a violation of the Federal Water Power Act and section 23 thereof.

IV

(24) Plaintiff further avers that it has at great expense acquired the necessary riparian lands and constructed the said London and Marmet Dams hereinbefore referred to and is now constructing the Winfield Dam in the Kanawha River and through the Federal Power Commission has issued to the Kanawha Valley Power Company a license to utilize the waters of said stream for generation of hydroelectric power at the London and
18 Marmet Dams; that the compensation fixed by the Federal Power Commission and agreed to be paid by the said licensee is based upon the flow of water at the said dams available for producing power and such compensation will, under the requirements of section 10 (e) of the Federal Water Power Act (16 U. S. C. 803), be affected in the future in accordance with variations in the volume and value of said flow for the purpose of generating hydroelectric power; that the operation of said Radford project will cause fluctuations in the flow of said river which will cause changes in the water levels in the pools created by the dams below the said project, and will also cause violent changes in the amount of water available for power purposes at the hydroelectric plants now under license from plaintiff at said Marmet and London dams, thus reducing the amount of the income to be derived by the plaintiff from these said developments; that all of the aforesaid conditions and circumstances will arise unless the said project is operated under the terms and conditions of a license as required by the Federal Water Power Act.

(25) Plaintiff avers that the defendant, Appalachian Electric Power Company, began the construction of said Radford project, and is continuing the construction of the same, all as hereinbefore more particularly set forth; that the defendant is threatening to interfere with the natural flow of said New and Kanawha Rivers, in violation of the property rights of the plaintiff as owner of the lands, dams, locks, and improvements, and other property hereinbefore described; that the damages suffered by plaintiff by said acts cannot now be estimated, but will be very large; and that said acts are in violation of law, and in derogation of the sovereign authority of the plaintiff in its lands and over interstate and foreign commerce, and that said acts particularly violate sections 9 and 10 of the River and Harbor Act of March 3, 1899 (35 U. S. C. 401, 403), and the Federal Water Power Act (16 U. S. C. 791–823).

V

(26) Plaintiff further avers that the Federal Water Power Act, as evidenced by its title and content, was passed by Congress for the purpose of securing the development of navigation on
19 the large river systems of the country by promoting the construction of dams, with pools, in the shoals and rapids where navigation is interrupted, and by the construction of regulating reservoirs in the upper portions of the streams; that said Act requires the working out by the Federal Power Commission of comprehensive plans for the improvement of such river systems providing for coordination of navigation, with water power and other beneficial uses; that, in conjunction with other laws pertaining to navigable waters hereinafter referred to, it requires projects affecting the interests of interstate and foreign commerce to be constructed only under authority of the plaintiff as required by law, and under the conditions prescribed by licenses issued pursuant to said Act; that such licenses so issued require the operation of headwater reservoirs in a manner best adapted to the combined uses of navigation, power, flood control, and other beneficial public uses and (by section 10 (f) of the Act (16 U. S. C. 803)), require licensees on lower sections of the rivers to contribute toward the construction and maintenance of reservoirs by which they are benefited.

(27) Plaintiff avers that pursuant to the provisions of section 4 of the Federal Water Power Act (16 U. S. C. 797), section 10 of the Act of May 15, 1928 (45 Stat. 538, 33 U. S. C. 702j), and many other acts of Congress, and pursuant to the orders of the President issued under authority of the National Industrial Recovery Act, approved June 16, 1933, plaintiff has caused studies to be made for development of the New-Kanawha River system and is considering and drafting comprehensive plans for the development of navigation, flood control, prevention of soil erosion, development of water power, and other public uses of said stream system; that the proper development of said streams and its tributaries requires that the selection of the dam sites and of structures to be located thereon and therein be coordinated under the control of the plaintiff either by ownership or by license under the Federal Water Power Act; and that the said project now under construction by defendant, Appalachian Electric Power Company, if not under license of and control by plaintiff, is not adapted to fit into said plans or any plan to improve navigation on New River and Kana-
20 wha River in that it will alternately and periodically and for a large part of the time restrain the full flow of the stream

or release damaging waves of water; that the defendant has made no plans for the construction or operation of locks at the project dam in aid of navigation, and seeks to avoid making such provisions for locks, as well as to avoid the requirement that they shall contribute in proportion to their benefits toward the construction of the headwater improvements considered in said comprehensive plan and contemplated by said Federal Water Power Act; and, in so far as the operation of the said Radford project shall be intermittent or inconstant and not synchronized with other projects and developments under the control of this plaintiff, it will interfere with existent and prospective commerce on the New and Kanawha Rivers and with the operation of the works constructed by plaintiff to improve navigation.

(28) Plaintiff avers that the defendant, Appalachian Electric Power Company, in locating and commencing to construct said Radford project without the authority and consent of the plaintiff, has acted in violation of and is violating the Act of March 3, 1899 (33 U. S. C. 401), requiring the consent of Congress and of the Secretary of War and Chief of Engineers to the building of any structure in a navigable water of the United States; that the defendant in performing said acts has acted in violation of and is violating the Act of March 3, 1899 (33 U. S. C. 403), requiring the authority of the Secretary of War, and recommendation of the Chief of Engineers before commencing any work that will alter or modify the condition, or capacity of the channel of any navigable water of the United States; that the defendant in said acts has acted in violation of and is violating the Act of June 10, 1920 (16 U. S. C. 817), requiring a license from the the Federal Power Commission before beginning construction of any project and proceeding therewith after a finding by the Federal Power Commission that the project proposed would affect the interests of interstate commerce; and that the defendant in said acts has injured and is threatening injury to the rights of the plaintiff by reason of the effect of said acts upon the navigable capacity of the New and Kanawha Rivers, upon the improvements already made and now being made by the plaintiff and upon the income which plaintiff will receive
21 by reason of said improvements; that by said acts the defendant is interfering with and obstructing the plans of the plaintiff for the development and protection of the natural resources of the Nation and will prevent future development by the plaintiff in accordance with plans now formulated and to be formulated under the provisions of the Federal Water Power Act (16 U. S. C. 791–823), of the Weeks' Act (16 U. S. C. 513–

519), the many River and Harbor Acts which have been passed by Congress for many years for the improvement of navigation and development of the inland water courses throughout the United States, and particularly that Act approved June 21, 1927 (44 Stat. 1010), under which surveys have been made of the region involved in this Bill of Complaint; Section 10 of the Act of Congress for the control of floods on the Mississippi River and its tributaries, approved May 15, 1928 (33 U. S. C. 702 j); Sections 201 and 202 of the National Industrial Recovery Act, approved June 16, 1933, and the order of the President (Executive Order No. 6251, approved August 19, 1933), pursuant thereto.

(29) On information and belief, plaintiff avers that the aforesaid obstruction of the navigable waters of New River, without authority of the plaintiff, by said defendant, constitutes a trespass by defendant upon a public highway of commerce, in derogation of paramount rights of the plaintiff therein, that the project of the defendant in course of construction is a public nuisance, that when the project is completed and put in operation it will be a public nuisance.

(30) Plaintiff avers that it has no adequate remedy at law for the wrongs complained of in this bill of complaint or for any of them.

Wherefore, the premises considered, and to the end that it may obtain from this Honorable Court the relief to which it is by right and equity entitled, the plaintiff prays:

(1) That process issue out of this Honorable Court requiring the defendant to appear and make full, true, and perfect answer to this bill of complaint, but not under oath, answer under oath being expressly waived.

(2) That an injunction issue pendente lite restraining the defendant from continuing the construction, maintenance, and operation of the said Radford project until final hearing or further orders of this Court.

(3) That after a full hearing herein an order issue out of this Honorable Court enjoining the defendant from constructing, maintaining, or operating the said Radford project, otherwise than under a license to be procured by said defendants from the Federal Power Commission, as required by law, or in the alternative.

(4) That the Court issue a mandatory order, to require the defendants to remove all or any part of such project works which lie within the limits of New River.

(5) And for such other and further relief as to the Court may seem just and proper.

(Signed) JOSEPH H. CHITWOOD,
United States Attorney.
(Signed) HUSTON THOMPSON,
Special Assistant to the Attorney General.
(Signed) ALLAN D. JONES,
Special Assistant to the Attorney General.
(Signed) OSWALD RYAN,
General Counsel, Federal Power Commission.
(Signed) JOSEPH H. CHITWOOD,
Solicitors for Plaintiff.

[*Duly sworn to by Joseph H. Chitwood; jurat omitted in printing.*]

23 In United States District Court

[Title omitted.]
[File endorsement omitted.]

Motion to amend bill of complaint

Filed September 13, 1935

To the Honorable JOHN PAUL, *Judge of said Court:*

Comes now the plaintiff and respectfully moves this Honorable Court for leave to amend the Bill of Complaint filed herein by the plaintiff in the following particulars:

I

(1) That paragraph (18) of the Bill of Complaint herein be amended to read as follows:

"(18) Plaintiff further avers that on or about the 26th day of June 1926, New River Development filed its Declaration of Intention with the Federal Power Commission, pursuant to section 23 of the Act of June 10, 1920 (41 Stat. 1063, 16 U. S. C. 817), for the said Radford project, Virginia, which is the same project as the Radford project herein referred to, and on September 2, 1926, the defendant (successor in interest to the New River Development Company) filed formal application for a license for said project upon the understanding that such application can be withdrawn if it should develop that a Federal license is not

required.' Copy of said Declaration of Intention and
24 said application for a license are exhibited herewith and prayed to be read as a part hereof, being marked as Exhibit 'A.' That the said Declaration describes the scheme of development and represents the purpose of the proposed Radford project to be that of supplying hydroelectric power for public-utility use. That the pertinent part of section 23 of said Federal Water Power Act is as follows:

"'That any person, association, corporation, State, or municipality intending to construct a dam or other project works across, along, over, or in any stream or part thereof, other than those defined herein as navigable waters, and over which Congress has jurisdiction under its authority to regulate commerce between foreign nations and among the several States may, in their discretion, file declaration of such intention with the commission, whereupon the commission shall cause immediate investigation of such proposed construction to be made, and if upon investigation it shall find that the interests of interstate or foreign commerce would be affected by such proposed construction, such person, association, corporation, State, or municipality shall not proceed with such construction until it shall have applied for and shall have received a license under the provisions of this act. If the commission shall not so find, and if no public lands or reservations are affected, permission is hereby granted to construct such dam or other project works in such stream upon compliance with State laws.'"

II

That paragraph (20) of the Bill of Complaint filed herein be amended to read as follows:

"(20) Plaintiff further avers that upon the filing of said Declaration of Intention the Federal Power Commission, as required by section 23 of the Federal Water Power Act, caused an investigation to be made, and having examined into the matter and studied the plans of said defendant held a hearing, giving
25 full opportunity to the declarant, New River Development Company and its successor, the defendant, Appalachian Electric Power Company, to introduce evidence and be heard in argument, and the Commission at its meeting on June 1, 1927 and at other meetings thereafter made it findings which are prayed to be read and considered as a part hereof."

(Signed) JOSEPH H. CHITWOOD,
Joseph H. Chitwood,
United States District Attorney.

26 Exhibit A—Bill of Complaint

NEW RIVER DEVELOPMENT CO.

Declaration of Intention To Construct a Dam and Other Project Works

June 25th, 1925

NEW RIVER DEVELOPMENT COMPANY,
31 NASSAU STREET,
New York, June 25th, 1925.

DECLARATION OF INTENTION TO CONSTRUCT A DAM AND OTHER PROJECT WORKS

New River Development Company, a public service corporation organized and existing under and by virtue of Chapter 150 of the Code of Virginia, intending to construct a dam and other project works across, along, over and in New River in the County of Pulaski, State of Virginia, hereby makes and files declaration of its intention so to do, pursuant to the provisions of Section 23 of the Federal Water Power Act and respectfully requests the Federal Power Commission to cause an immediate investigation of such proposed construction to be made.

In compliance with Regulation 7 of the Regulations of the Federal Power Commission, this Declaration of Intention is accompanied by exhibits which are hereby referred to and made a part hereof, as follows:

Exhibit A: Sketch map showing the stream to be utilized and the approximate location of the project as follows:

1. Map of Viele, Blackwell & Buck, Engineers, No. A–6836, showing general location of Project on New River;

2. Map of Viele, Blackwell & Buck, Engineers, No. R–7652, showing portion of river immediately affected by Project;

3. Map of Viele, Blackwell & Buck, Engineers, No. R–7656, showing general plan of proposed development.

Exhibit B: A brief description of the Project and its purpose, including data with respect to proposed height of dam, storage capacity of reservoir, power capacity of the Project and probable effect on present or prospective navigation;

27 Exhibit C: A statement as to whether, if the Commission finds that the Project will affect the interests of interstate or foreign commerce, the applicant proposes to apply for a permit or a license.

In witness whereof the applicant has caused its corporate name to be hereunto affixed by George N. Tidd, its Vice President, and its corporate seal to be hereunto affixed and attested by Frank B. Ball, its Secretary, thereunto duly authorized this 25th day of June 1925.

NEW RIVER DEVELOPMENT COMPANY,
By (Signed) GEORGE N. TIDD, *Vice-President*,

Attest:
[SEAL] (Signed) FRANK B. BALL, *Secretary*.

Declaration of Intention—Exhibit B

DESCRIPTION OF PROJECT OF NEW RIVER DEVELOPMENT COMPANY IN NEW RIVER, VIRGINIA

Under this Project it is proposed to develop for the purpose of generating hydroelectric power the fall in New River from the Norfolk & Western Railroad bridge at Hiawassie, Virginia, to a point near the mouth of Little River, a distance of approximately 20 miles with a fall of 110 feet. The dam is to be located about one mile above Little River or approximately seven miles above the town of East Radford. The development will be formed by a dam across the New River, with the powerhouse in front of the dam fed by short steel penstocks. The dam will be constructed of Cyclopean concrete on solid rock foundations and abutment, and provided with ample flood gates and spillway.

The principal elevations and data pertaining to the project are as follows:

Drainage area	2,396 sq. mi.
Water surface at dam site	El. 1,730 ±
High water over dam	El. 1,841
Top of retaining section and intake	El. 1,850
Top of flood gates and flashboards	El. 1,840
Sill of floodgates	El. 1,810
Crest of Spillway	El. 1,835
Height of Spillway section at deepest point	115 ft.
Height of intake section at deepest point	128 ft.
Pond formed by dam, about	4,000 acres
Storage with 10 ft. draft, about	40,000 acre ft.
Installed capacity	60,000 kw. or 80,000 hp.
Yearly output	200,000,000 kwh. ±

28 Eighty percent of all lands and water rights required for the development have already been purchased by or for the company.

There is no navigation in this section of the River, except ferry travel which will not be interfered with by the development, nor is there any navigation for approximately 160 miles below the proposed development. The proposed Project will be constructed

and operated so as not to impair the navigable capacity of the stream below, nor to affect the interests of interstate or foreign commerce.

The foregoing description of Project of New River Development Company is a part of the Declaration of Intention made by the undersigned this 25th day of June, 1925.

NEW RIVER DEVELOPMENT COMPANY,
By (Signed) GEO. N. TIDD, *Vice-President.*

Attest:
[SEAL] (Signed) FRANK B. BALL, *Secretary.*

Declaration of Intention—Exhibit C

STATEMENT WITH REFERENCE TO APPLICATION FOR PERMIT OR LICENSE

If the Commission should find that the Project will affect the interests of interstate or foreign commerce the Board of Directors of the Declarant Company, immediately upon receipt of advice to such effect, will consider and determine whether the Declarant proposes to apply for a permit or for a license.

This statement is a part of the Declaration of Intention made by the undersigned this 25th day of June 1925.

NEW RIVER DEVELOPMENT COMPANY,
By (Signed) GEO. N. TIDD, *Vice-President.*

Attest:
[SEAL] (Signed) FRANK B. BALL, *Secretary.*

29 SEPTEMBER 2, 1926.

Re: Declaration of Intention of New River Development Company—Application for License, Appalachian Electric Power Company

FEDERAL POWER COMMISSION, *Washington, D. C.*

DEAR SIRS: We beg to advise that Appalachian Electric Power Company, a Virginia public-service corporation, has recently acquired, among others, the properties heretofore held by New River Development Company for the proposed development on New River in Pulaski County, Virginia, which has been the subject of a Declaration of Intention on the part of that Company before your Commission.

We enclose an instrument, substantially in the form approved by your counsel as advised in Major Edgerton's letter to us of December 19, 1925, which has been executed by New River Development Company and Appalachian Electric Power Company, whereby the former transfers to the latter its rights and the lat-

ter assumes the obligations, under the Declaration of Intention of New River Development Company.

In order to expedite matters, Appalachian Electric Power Company is adopting the suggestion made by you in your letter of July 1, 1925, and is submitting herewith an application for a license for the proposed project, upon the understanding that such application can be withdrawn if it should develop that a Federal license is not required.

Under these circumstances we request that action on the Declaration of Intention, referred to in your letter of August 19, 1926, addressed to New River Development Company, be deferred for consideration at the same time as the application for license by Appalachian Electric Power Company.

The application of Appalachian Electric Power Company, executed in triplicate, is enclosed herewith but maps and drawings submitted as exhibits go forward under separate cover, rolled.

We should appreciate your early advice regarding arrangements for the publication of the required notice of application of Appalachian Electric Power Company for a license, which we should like to have commenced as soon as possible.

Very truly yours,

CURTIS, MALLET-PREVOST, COLT & MOSLE.

CMM–12.
Encl.

30 APPALACHIAN ELECTRIC POWER COMPANY

Application to Federal Power Commission for License (under Act of June 10, 1920) for Development No. 6, New River, a Major Project in the State of Virginia

1. Appalachian Electric Power Company, a corporation organized and existing under and by virtue of the laws of the State of Virginia, and having its office and principal place of business at the City of Richmond, in the State of Virginia, does hereby make application to the Federal Power Commission for a license for a project described herein and shown on general and detailed maps signed by applicant on the 30th day of August 1926, which maps are filed herewith and made a part hereof, said license to authorize the construction, operation, and maintenance of certain project works, the principal ones of which are designated as follows on said maps:

(a) Dam and Reservoir:

Concrete dam, height 110 feet, across New River. Reservoir approximately 19 miles long created by dam. Surface area of Reservoir approximately 4,000 acres.

(b) Water Conduits:

Turbines will be connected to intakes by steel penstocks imbedded in retaining section of dam.

(c) Powerhouse:

Powerhouse will be a brick and steel structure containing 4 and possibly 5—15,000 K.W. alternating current generators.

(d) Transmission Lines:

Power is generated at 13,200 volts 60 cycles, and is conducted into the transmission system already in operation located outside of project boundary about 500 feet from Powerhouse.

2. The location of the project applied for is as follows:

(a) In the State of Virginia.

(b) In the County of Pulaski.

(c) On the following-named stream; New River. Navigable and carrying commerce to the following extent: None, but tributary to the Kanawha River, which is navigable and carrying commerce up to Montgomery, W. Va., 155 miles below the project.

31 (d) In the region of the following-named cities and towns: Radford, Virginia; Pulaski, Virginia.

3. The proposed scheme of development for project is as follows:

A concrete dam across New River 1,627 feet long made up as follows:

	Length	Max. Height
South retaining section	240′	100′
Intake section	210′	128′
Spillway section	715′	115′
Flood gate section	282′	72′
North retaining section	180′	42′

South of the main dam a small dyke will be required about 300 feet long and 30 feet high.

The spillway allows for 6 feet overflow for a length of 675 feet and the gate section contains 4 flood gates 30′ x 50′.

Powerhouse is adjacent to and below south end of dam and will comprise 4 or possibly 5—20,000 H. P. vertical shaft turbines driving 15,000 K.W. 60-cycle generators. Turbines will have steel scroll cases connected to intakes by steel penstocks imbedded in retaining section of dam. The operating head will range from 100 to 110 feet.

4. The proposed market for the power to be developed is as follows:

All power which can be generated will be fed to an interconnected transmission system now in operation, which passes the proposed project site, and is connected with an operating network which is already generating approximately 300,000 K.W. by steam

and wafer power and rapidly increasing. Network is interconnected from Ohio down to North Carolina.

All power generated can be utilized as soon as available.

5. The location and capacity of all power projects owned or operated by the applicant, the markets supplied thereby, and the relation thereof to the Project applied for, are briefly described as follows:

	Location	Capacity
Glen Lyn Steam Plant	Glen Lyn, Virginia	85,000 K.W.
Cabin Creek Steam Plant	Cabin Creek, West Va	83,200 K.W.
Logan Steam Plant	Logan, West Va	40,000 K.W.
Kenova Steam Plant	Kenova, West Va	16,750 K.W.
Back Water Creek Steam Plant	Lynchburg, Virginia	8,000 K.W.
Walnut Avenue Steam Plant	Roanoke, Virginia	7,000 K.W.
Slack Street Steam Plant	Charleston, West Va	8,450 K.W.
Hazard Steam Plant	Lothair, Kentucky	16,000 K.W.
Sprigg Steam Plant	Sprigg, West Va	7,500 K.W.
Byllesby Hydro Plant	Byllesby, Virginia	18,000 K.W.
Buck Hydro Plant	Buck, Virginia	6,210 K.W.
Reussens Hydro Plant	Lynchburg, Virginia	4,500 K.W.
Niagara Hydro Plant	Roanoke, Virginia	2,926 K.W.
	Total	298,536 K.W.

32 The foregoing include all the plants of the applicant and its subsidiary companies.

Applicant, together with its subsidiary companies, supplies electric energy to the western portion of Virginia, the southern half of West Virginia and the eastern portion of Kentucky.

The total K.W.H. output of applicant's system for the year 1925 was approximately 860,000,000 K.W.H. This output of electric energy was used in the various industrial communities in Virginia and West Virginia and Kentucky, a large proportion of the coal in this region being mined thereby and many chemical works being operated thereby, in addition to the service of light and power to many cities and communities.

The project applied for will, upon completion, become part of the above described system and will supply additional electric energy which is demanded by the territory served.

6. The following exhibits are filed herewith and are hereby made a part of this application:

Exhibit A: Certified copy of Organization papers;

Exhibit B: Other evidence that Applicant is qualified to proceed with the Project applied for;

Exhibit C: Statement re field notes of Project boundary;

Exhibit D: Statement re applicant's compliance with requirements of laws of State of Virginia;

Exhibit E: Statement of nature, extent, and ownership of water rights;

Exhibit F: Statement of nature, extent, and ownership of lands;

Exhibit G: Statement concerning financial ability of applicant to carry out project applied for;

Exhibit H: Statement of effect of Project on stream flow;

Exhibit I: Estimate of power capacity of project;

Exhibit J: General map covering the entire project area;

Exhibit K: Detail map covering entire project area;

Exhibit L: General design drawings of principal structures and appurtenant works;

Exhibit M: General descriptions and specifications of mechanical, electrical, and transmission equipment;

Exhibit N: Estimate of cost of developing project;

Exhibit O: Statement of time desired for completing construction of project works.

In witness whereof the applicant has caused its name and corporate seal to be hereunto signed and affixed by N. M. Argabrite, its Vice-President thereunto duly authorized, this — day of August 1926.

[CORPORATE SEAL] APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice-President.*
Attest:
(Sgd.) FRANK B. BALL, *Secretary.*

33 Application for License—Exhibit A

Pursuant to Regulation 4, Section 1

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

CERTIFIED COPY OF ORGANIZATION PAPERS

Organization papers of the applicant are submitted herewith, as Exhibit A, as follows:

1. Copy of Articles of Association of Appalachian Electric Power Company, filed in the office of the Secretary of the Commonwealth of Virginia, March 4, 1926, certified by the Secretary of the Commonwealth of Virginia.

2. Copy of Merger Agreement, Appalachian Electric Power Company, Appalachian Power & Light Company, and Appalachian Power Company, filed in the office of the Secretary of the Commonwealth May 1, 1926, certified by the Secretary of the Commonwealth of Virginia.

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice-President.*

Application for License—Exhibit B

Pursuant to Regulation 4, Section 2

Application for License—Appalachian Electric Power Company

Official statement of organization of the corporation and list of officers and directors

I, Frank B. Ball, Secretary of Appalachian Electric Power Company, do hereby certify that the organization of said corporation has been completed; and that the corporation is authorized to proceed with the project applied for according to the existing laws of the State of Virginia.

I further certify that the following is a true list of the principal officers and of the directors of the said corporation, with the full name and official designation of each, to wit:

Officers

Name	Office
R. E. Breed	President.
George N. Tidd	Vice-President.
N. M. Argabrite	Vice-President.
E. H. Maurer	Vice-President.
Frank B. Ball	Treasurer.
Frank B. Ball	Secretary.
Frank P. Hunter	Assistant-Treasurer.
J. F. McMillan	Assistant-Treasurer.
F. W. Drager	Assistant-Treasurer.
Frank P. Hunter	Assistant-Secretary.
J. F. McMillan	Assistant-Secretary.
F. W. Drager	Assistant-Secretary.

34 Directors: R. E. Breed, George N. Tidd, Frank B. Ball, F. W. Drager, N. M. Argabrite, N. M. Seabrease, Richard B. Scandrett, Jr.

Witness my hand and the seal of the corporation this 30th day of August 1926.

[CORPORATE SEAL] (Sgd.) FRANK B. BALL, *Secretary.*

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

Application for License—Exhibit C

Pursuant to Regulation 4, Section 3

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

STATEMENT RE FIELD NOTES OF PROJECT BOUNDARY

The final location survey of the project boundary is shown by metes and bounds on map submitted herewith as Exhibit K. Field notes are not submitted, the information being presented on the map referred to.

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

35

Application for License—Exhibit D

Pursuant to Regulation 4, Section 4

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

STATEMENT RE APPLICANT'S COMPLIANCE WITH REQUIREMENTS OF LAWS OF STATE OF VIRGINIA

Applicant is a corporation duly organized and existing under the laws of State of Virginia, with powers to construct, maintain and operate works, including all kinds of water, electric, and other power plants, to be used for public service in the business of a general electric lighting and power corporation, with all the rights, powers, and privileges of such corporations under the laws of the State of Virginia. Such rights and powers include statutory right and power to acquire by condemnation, in the event the applicant cannot agree with the owners upon terms of purchase, all lands and rights, including rights as to bed and banks of the stream, necessary to construct, maintain, and operate the project applied for.

There are no other requirements of the laws of the State of Virginia with respect to bed and banks and with respect to the right to engage in the developing, transmitting, and distributing of power and in any other business necessary to effect the purposes of the license applied for, which need be complied with by the applicant.

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

Application for License—Exhibit E

Pursuant to Regulation 4, Section 5

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

STATEMENT OF NATURE, EXTENT, AND OWNERSHIP OF WATER RIGHTS

Under Virginia law water rights pertain to the riparian owners, on nonnavigable streams such as New River. Applicant and its predecessors in interest have been engaged for many years past in negotiation for the purchase of riparian lands and appurtenant water rights required for the project applied for and has acquired by purchase approximately eighty percent (80%) of the necessary riparian lands, with appurtenant water rights. It has proceeded, as far as practicable, in perfecting its rights to use sufficient water for proper operation of the project works and has found that it will be necessary to institute condemnation proceedings to acquire the balance of the necessary water rights.

There exists in Virginia no State agency authorized or empowered to give a certified statement setting forth the extent and validity of the applicant's water rights.

36 No approval or permission of any State agency is required by Virginia law as a condition precedent to the applicant's right to take or use water for the operation of the project works.

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

Application for License—Exhibit F

Pursuant to Regulation 4, Section 6

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

STATEMENT OF THE NATURE, EXTENT, AND OWNERSHIP OF LANDS

Approximately 80% of the total acreage of lands required for the construction and operation of the project, including all land within the project area, has already been acquired by the Appli-

cant. The Applicant plans to acquire the balance of the necessary lands by condemnation proceedings under the laws of the State of Virginia and/or under the Federal Water Power Act.

The applicant at the time of filing this application has acquired the right to occupy and use lands owned by others as follows:

Acquired from	Date	Nature of right term	Expiration of term
S. T. Rigney, et ux	4/12/24	To submerge lands	Perpetual.
Bruce Clark, et ux	3/11/25	To submerge lands	Perpetual.
F. E. Roope	6/19/23	Railroad right-of-way	Perpetual.
H. L. Fagg, et ux	9/19/23	Railroad right-of-way	Perpetual.
W. C. Flinchun, et ux	9/19/23	Railroad right-of-way	Perpetual.
W. A. Earhart	9/21/23	Railroad right-of-way	Perpetual.
Bd. Supervisors, Pulaski County	6/22/25	To submerge lands	Perpetual.

This statement is part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

37 Application for License—Exhibit G

Pursuant to Regulation 4, Section 7

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

STATEMENT CONCERNING FINANCIAL ABILITY OF APPLICANT TO CARRY OUT PROJECT APPLIED FOR

Applicant is a going concern, owning and operating directly and through subsidiary corporations, extensive electric light and power properties in the States of Virginia, West Virginia, and Kentucky.

Applicant's capitalization is substantially as follows:

	Outstanding with public
Funded Debt:	
Underlying Divisional Bonds	$23,991,000
First and Refunding Mortgage Gold Bonds 5% Series of 1956	35,000,000
Appalachian Power Company 6% Gold Debentures	4,000,000
6% Note due on or before April 1, 1929	5,000,000
Capital Stock (no par value):	
Preferred Stock: $7 Cumulative 225,000 Shares.	
2d Preferred Stock: $7 Cumulative 100,000 Shares.	
Common Stock: 5,000,000 Shares.	

Earnings for the twelve months ending February 28, 1926, derived from properties now owned by the applicant and its subsidiary corporations were substantially as follows:

Gross Earnings		$15,380,631
Operating Expenses, Maintenance and Taxes		7,474,502
Net Earnings		$7,906,129
Annual Interest Requirements on Underlying Divisional Bonds held by the Public	$1,249,550	
$35,000,000 First and Refunding Mortgage Gold Bonds	1,750,000	
		2,999,550
Balance available for other charges, renewals and replacements reserves, dividends, etc		$4,906,579

It has recently marketed an issue of $35,000,000 First and Refunding Mortgage Gold Bonds (including in the capitalization above set forth) on a 5.20% yield basis. Its financial resources are deemed sufficient to finance the project applied for, which is designed to form one of the production units of applicant's system, the development of which is in response to the growth of an already existing consumers' demand for electric energy.

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

38 Application for License—Exhibit H

Pursuant to Regulation 4, Section 8

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

STATEMENT OF EFFECT OF PROJECT ON STREAM FLOW

Proposed reservoir will back up water for approximately 19 miles above dam. Surface area of reservoir about 4,000 acres. Storage with 10-foot draft on reservoir 40,000 acre-feet.

The minimum flow proposed to be released during periods of low water shall be such amount as shall be required for the purposes of power, navigation, flood control, and municipal water supply. The proposed ponding of water will tend to equalize seasonal variations, to increase the minimum flow during low-water periods and reduce flood peaks below the project.

This statement is a part of the application for a license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

Application for License—Exhibit I

Pursuant to Regulation 4, Section 9

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

ESTIMATE OF POWER CAPACITY OF PROJECT

Estimate of power capacity of the project is the continued product of:

A. The factor—0.08;

B. The average static head in feet, viz, 106 feet; and

C. The water supply in cubic feet per second and not in excess of the hydraulic capacity of the approved project works, estimated (from duration curve) to be available from net flow or from storage, or from both, for 90% of the time, viz, 1,200 equals 10,176 H. P.

Data upon which such estimate is based is attached hereto and submitted herewith, viz: Duration curve, marked Exhibit I–A (for static head, see Exhibit L–4).

A list of all sources of power for the system of which the project will be a part is set forth in Exhibit A–5, hereto attached, to which reference is hereby made.

39 This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

Application for License—Exhibit J

Pursuant to Regulation 4, Section 10

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

GENERAL MAP COVERING ENTIRE PROJECT AREA

A general map covering the entire project area showing drainage area and important features of the project, state and county lines, etc., on a single sheet is submitted herewith denominated "Exhibit J." This map is accompanied by two blue prints.

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

Application for License—Exhibit K

Pursuant to Regulation 4, Section 11

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

DETAIL MAP COVERING ENTIRE PROJECT AREA

Detail map covering entire project area, on a single sheet, is submitted herewith, denominated "Exhibit K." The drawing is accompanied by two blue prints. The lands marked on said map "A. P. Co." are owned by the applicant. The lands for which applicant holds rights of use and occupancy for purposes of the project are referred to in "Exhibit F" hereof.

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

Application for License—Exhibit L

Pursuant to Regulation 4, Section 12

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

GENERAL DESIGN DRAWINGS OF PRINCIPAL STRUCTURES AND APPURTENANT WORKS

The following drawings are submitted herewith:
L-1 Elevation and Plan of Dam Site;
L-2 Flood Gates;
L-3 Profile of Diamond Drill Holes;
L-4 Cross Section and Analysis of Dam;
L-5 Analysis of Flood Gate Piers.
Each drawing is accompanied by two blue prints.

This statement is a part of the application for license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice-President.*

Application for License—Exhibit M

Pursuant to Regulation 4, Section 13

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

GENERAL DESCRIPTIONS AND SPECIFICATIONS OF MECHANICAL ELECTRICAL AND TRANSMISSION EQUIPMENT

Hydraulic Data:

4—vertical shaft Francis type single runner turbines, steel scroll cases, details concerning which will later be submitted. (A 5th unit may be installed.)

Nominal rating 20,000 H. P.

Generator & Exciter Data:

4—vertical shaft 13,200-volt 60-cycle alternating-current generators with direct connected exciters (a 5th unit may be installed), details concerning which will later be submitted.

Transmission:

Cables will be led from generators through conduits to interconnected transmission systems beyond the project boundary where voltage will be transformed to system voltage.

This statement is a part of the application for a license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice-President.*

41 Application for License—Exhibit N

Pursuant to Regulation 4, Section 14

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

ESTIMATE OF COST OF DEVELOPMENT PROJECT

Estimate of cost of developing the project is as follows:

Unwatering	$200,000	$200,000
Preparing bottom	50,000	50,000
No. Retaining Wall—180':		
Excavation—Earth, 1,200 c. y. @ $1	1,200	
" —Rock, 500 c. y. @ $4	2,000	
Concrete, 3,000 c. y. @ $8.50	25,500	
Reinforcing, 5,000 # @ $0.05	250	
		28,950

Flood Gates 282':		
Excavation—Earth, 14,000 c. y. @ $1	$14,000	
" —Rock, 3,000 c. y. @ $4	12,000	
Concrete, 20,000 c. y. @ $9	180,000	
Reinforcing, 100,000 # @ $0.05	5,000	
4 Stoney Gates, hoist & towers 30' x 50'	130,000	
1 set of stop logs & hoist	17,000	
Lights, power, wiring, etc	5,000	
		$363,000
Spillway Section 715':		
Excavation—Earth, 13,000 c. y. @ $1	13,000	
" —Rock, 8,000 c. y. @ $4	32,000	
Concrete, 160,000 c. y. @ $8	1,280,000	
Reinforcing, 200,000 # @ $0.05	10,000	
Trash chute logs & details	1,500	
Tunnel, stairs, etc	5,000	
Flashboards 675' x 5'	5,000	
		1,346,500
Intake Section 210':		
Excavation—Earth, 17,000 c. y. @ $1	17,000	
" —Rock, 2,000 c. y. @ $4	8,000	
Concrete, 49,000 c. y. @ $8.50	416,500	
Reinforcing, 100,000 # @ $0.05	5,000	
Racks, supports, guides, etc., 6,000 sq. ft. @ $4	24,000	
1 gate and gantry	20,000	
1/16' penstocks, 660,000 # @ $0.08	52,800	
Railings, covers, lights, power, etc	5,000	
		548,300
South Retaining Wall 240':		
Excavation—Earth, 8,000 c. y. @ $1	8,000	
" —Rock, 2,000 c. y. @ $4	8,000	
Concrete, 24,000 c. y. @ $8.50	204,000	
Reinforcing, 40,000 lbs. @ $0.05	2,000	
		222,000
Forward		$2,758,750
Dam in Hollow South of Main Dam 325':		
Excavation	1,000	
Core wall concrete, 1,200 c. y. @ $12	14,400	
Earth fill, 16,000 c. y. @ $0.75	12,000	
		27,400
42 **Power House Substructure 210':**		
Excavation—Earth, 13,000 c. y. @ $1	13,000	
" —Rock, 6,000 c. y. @ $2.50	15,000	
Concrete 10,000 c. y. @ 14.00	268,000	
Reinforcing 600,000 # 0.05	30,000	
Piping	5,000	
		329,000
Power House Superstructure:		
730,000 cu. ft	165,000	165,000
Tail Race:		
Excavation—Earth, 72,000 c. y. @ 0.75	54,000	
" —Rock, 22,000 c. y. @ $2.50	55,000	
Concrete, 9,000 c. y. @ $9.00	81,000	
		190,000

Power House Equipment:		
Water wheels, gov., etc., 80,000 HP @ $3.50	$280,000	
Frt. & erection	42,000	
Generators & exciters, 60,000 KW. @ 8	480,000	
Frt. & erection	48,000	
Switchboard & switches	50,000	
Frt. & erection	10,000	
Pumps, piping & elec. supplies	25,000	
75-ton crane	19,000	
4–16' ø Butterfly valves	120,000	
Frt. & erection	12,000	
		$1,086,000
Camp & Plant:		
Clearing and grubbing camp site	5,000	
10 cottages @ $4,250 (permanent operators)	42,500	
Temporary buildings & equipment	80,000	
Construction plant	350,000	
Maintenance of Const. plant	70,000	
Construction trestles	25,000	
R. R. siding	20,000	
Roads	25,000	
		617,500
		$5,173,650
Forward		$5,173,650
General Expense:		
Clearing, reservoir, 3,000 A @ $10	$30,000	
New Highway, 10 mi. @ $5,000	50,000	
Motorizing 4 Ferries	10,000	
2 New ferries, Peek Creek	10,000	
Concrete casing to R. R. Viaduct	2,000	
Raising Highway Bridge	6,000	
Insurance on labor	50,000	
Fire insurance & protection	10,000	
		168,000
		$5,341,650.00
Superintendence, engineering, and contingencies 15%		801,247.50
		$6,142,897.50

The above estimate does not include the following items:

Cost of property.

Interest during construction.

This statement is a part of the application for a license made by the undersigned this 30th day of August, 1926.

APPALACHIAN ELECTRIC POWER COMPANY,

By (Sgd.) N. M. ARGABRITE, *Vice President.*

43 Application for License—Exhibit O

Pursuant to Regulation 4, Section 15

APPLICATION FOR LICENSE—APPALACHIAN ELECTRIC POWER COMPANY

STATEMENT OF TIME DESIRED FOR COMPLETING CONSTRUCTION WORKS

A period of one year from the date of license is desired for beginning construction of the project works and a period of four years from the date of license is desired for completing construction of the project works.

This statement is a part of the application for a license made by the undersigned this 30th day of August 1926.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) N. M. ARGABRITE, *Vice President.*

44 In United States District Court

[Title omitted.]

[File endorsement omitted.]

Answer

Filed June 3, 1925

To the Honorable JUDGE OF THE DISTRICT COURT OF THE UNITED STATES, WESTERN DISTRICT OF VIRGINIA:

For answer to the Bill of Complaint in the above-entitled cause, Appalachian Electric Power Company, the defendant above named, says:

1. Answering paragraph (1), defendant admits the allegations contained in said paragraph.

2. Answering paragraph (2), defendant admits the allegations contained in said paragraph.

3. Answering paragraph (3), defendant admits all of the allegations contained in said paragraph except that defendant avers and explains that the primary purpose for which it is constructing said dam is not to detain the flow of New River but rather to concentrate the fall thereof, i. e., to create a head which can be utilized in the generation of hydroelectric power and except that defendant specifically denies that it is unlawfully constructing said Radford project and says that it owns property rights derived and flowing exclusively from the State of Virginia and

that under and by virtue of said property rights and the laws of the State of Virginia it has complete and perfect right to construct and operate said Radford project.

4. Answering paragraph (4), defendant denies that New River is a navigable stream and says that New River is a nonnavigable interstate stream rising in North Carolina and flowing in a northerly and northwesterly direction across the State of Virginia
45 into West Virginia to its junction with the Gauley River at which point the said Gauley and New Rivers unite to form the Kanawha River, and that the Kanawha River flows in a northwesterly direction and discharges into the Ohio River at Point Pleasant, West Virginia, and defendant further says that the 60-mile section of New River which is furthest downstream, the upstream end of which section begins approximately 90 miles downstream from the Radford project, has physical characteristics such that it is known as the "Gorge," and says that throughout its entire length the physical characteristics of the channel of New River, including the rate of fall thereof, are such that it is not and never has been, used, and that it is not and never has been susceptible of being used, as a highway for interstate commerce.

Defendant denies that the said New and Kanawha Rivers constitute one continuous stream except in the sense that any river and any one of its tributaries constitute one continuous stream.

Defendant is advised that all of the allegations relating to the surveys made and records kept by plaintiff's agencies or relating to the flows of said New and Kanawha Rivers at the various times and places mentioned in said paragraph (4) are immaterial, argumentative, irrelevant, impertinent, and evidentiary, even if competent as evidence, and hence need not be answered.

Nevertheless, to avoid delay but without waiving the foregoing objections, defendant, answering, denies that it has any knowledge or information sufficient to form a belief as to surveys or records made and kept by plaintiff's agencies and as to the flows of said New and Kanawha Rivers at the various times and places and of the several durations alleged in said paragraph.

Defendant admits that it proposes to install, in its power house, machinery having an approximate aggregate capacity of 104,000 horsepower in four units of 26,000 horsepower each and that the hydraulic capacity of said installation is approximately 9,000 cubic feet of water per second.

46 Defendant denies the allegation that, in order to make use of said installed capacity, defendant must necessarily alternately impound and release large volumes of water and avers that the remainder of said paragraph consists solely of conclusions drawn by plaintiff from the last-mentioned allegation, hereinabove

denied. Defendant denies that, if and to the extent it might of its own volition, but not of necessity, cause some periodic variations in stream flow at the site of its dam and power station, such variations would cause substantial artificial variations in the flow of the Kanawha River or very great percentage variations from the natural flow of the Kanawha River, and further denies that such variations would or could diminish or impair or cause obstruction to the navigable capacity of any of the navigable waters of the United States, and avers that, even if, contrary to the fact, such variations did occur of necessity, then they would not and could not diminish or cause obstruction to navigable capacity anywhere.

5. Answering paragraph (5), defendant admits that the allegations as to gross storage capacity, utilizable storage capacity, and draw-down of defendant's proposed reservoir are substantially true. Defendant denies that, in making full use of the installed machinery, it would necessarily interfere with the natural flow of New River more than 95% of the time or that it would unreasonably interfere with the natural flow of the river at any time, and avers that at no time will defendant impound water so as to interfere with navigation on or the navigable capacity of the Kanawha River or any other stream. Defendant further avers that it intends not to operate, will not and could not operate said Radford project in any manner which would cause any interference with or obstruction to navigation or navigable capacity in violation of sections 9 or 10 of the Rivers and Harbors Act of March 3, 1899 (33 U. S. C. 401, 403); avers that defendant's intention so to construct and operate said project as not so to interfere or obstruct was expressly set forth in the Declaration of Intention for the said Radford project filed by
47 its predecessor, New River Development Company, with the Federal Power Commission on or about June 26, 1925; avers that it is entirely practicable and feasible from both engineering and economic points of view so to operate said Radford project; avers that Major-General H. Taylor, Chief of Engineers, U. S. Army, in a report dated December 29, 1925, to the Federal Power Commission respecting defendant's Radford project, stated that (even under the then-existing system of navigation dams) it would not be possible to operate the proposed project so as adversely to affect navigation on the Kanawha River; and avers that the Federal Power Commission has at various times recognized and admited the practicability and feasibility of constructing and operating the Radford project without causing interferenee with or obstruction to navigation or navigable capacity, and now merely claims, as set forth in the Bill, that after construction the project, if operated as defendant has disclaimed any intention of doing

(and the physical possibility of which defendant denies), might cause some interference with navigation or navigable capacity.

Defendant is advised that all of the remaining allegations of paragraph (5) relate to the sources of stream flow in the watersheds of the New and Kanawha Rivers and are immaterial, argumentative, irrelevant, impertinent, and evidentiary, even if competent as evidence, and hence need not be answered.

Nevertheless, to avoid delay, but without waiving the foregoing objections, defendant, further answering, denies that any periods of flow are critical from the viewpoint of navigation interests so far as concerns the Radford project; avers that Major General H. Taylor, Chief of Engineers, U. S. Army, in his report of December 29, 1925, to the Federal Power Commission, stated that the run-off from the drainage area below the Radford project is sufficient to supply the necessary water for navigation on the Kanawha River; and denies any knowledge or information sufficient to form a belief as to the allegations respecting the sources and proportions of stream flow during the months of October 1930 and September 1902.

48 6. Answering paragraph (6), defendant denies any knowledge or information sufficient to form a belief as to whether the Kanawha River, in its natural condition, was navigable; defendant specifically denies each and every other allegation contained in said paragraph except that defendant admits that plaintiff has substantially described the location of the Radford project and admits that some work was done by the United States within the two disconnected stretches of the New River specified by plaintiff in the attempted improvement thereof, but defendant avers that such work was done with the object of creating artificial navigability of a limited nature on the said disconnected sections of the nonnavigable New River, with no navigable connection whatever with each other or with any water of the United States over which interstate or foreign commerce could be conducted; that the work done upon these two isolated and disconnected sections of the nonnavigable New River was wholly ineffectual to create navigability by artificial means even upon such sections, and that it was found by plaintiff's agencies that such work was impracticable and ineffective and that its object had not been attained, whereupon it was abandoned by plaintiff.

Defendant avers and explains that between the two stretches of river of 26½ and 29¼ miles specified by plaintiff there intervenes a 60-mile stretch of falls, shoals, and rapids, which stretch likewise is nonnavigable and wholly precludes the connection of the two sections worked upon, even had they thus been made navigable, which they were not, and which 60-mile stretch lies

downstream from the Radford project and within which plaintiff did not even attempt any improvement. Defendant further avers that the total expenditure by plaintiff in attempted but ineffective improvement of New River was less than $110,000.

7. Answering paragraph (7), defendant is advised that all of the allegations of said paragraph are immaterial, argumentative, irrelevant, impertinent, and evidentiary, even if competent as evidence, and hence need not be answered.

Nevertheless, to avoid delay but without waiving the foregoing objections, defendant, answering, admits each and every allegation of paragraph (7) except as follows: Defendant denies that under the license issued to it by the State Corporation Commission of Virginia, defendant purports to have the right to impound as it sees fit the entire flow of the New River under the circumstances alleged by plaintiff or under any other circumstances and says that, although the said license by its terms purports to permit defendant to impound the flow of New River in the manner alleged in said bill of complaint, nevertheless neither the said license nor the Water Power Law of the State of Virginia (Chapter 424, Acts of Assembly, 1928, as amended in 1932), under which said license was issued, purports to permit any interference with navigation, that furthermore said Act expressly provides that nothing contained in said Act shall be so construed as to interfere with the exercise of lawful jurisdiction of the United States or its duly constituted agencies, and that in any event the Secretary of War has power summarily to remove any obstruction if any should occur; and defendant further says that it intends by the operation of the Radford project not to interfere with or obstruct, and that it will not interfere with or obstruct navigation or navigable capacity and alleges that it could not substantially interfere with or obstruct navigation or navigable capacity even if said project were operated without regard to any effect upon navigation or navigable capacity. Defendant denies that it has any knowledge or information sufficient to form a belief regarding the allegations as to flow of Little River except that defendant believes that the natural flow at the mouth of Little River would always be in excess of 25 cubic feet per second.

8. Answering paragraph (8), defendant admits that below the Radford project site plaintiff has in the past erected ten navigation dams in the Kanawha River, but says that the nearest of the said ten dams to the Radford project site was approximately 160 miles downstream therefrom and that only six of said ten dams are now in existence; and, on information and belief, avers that these remaining (downstream) six dams will be removed within a reasonably short time and before the completion of the Radford project by defendant; that the four dams

no longer existing have been replaced by the two new and modern navigation dams of plaintiff at London and Marmet, which dams have been completed and are in operation; that three of said six remaining dams will be removed upon the completion of the construction of the Winfield navigation project which has been authorized by plaintiff and is now under construction, and that the other three of said six remaining dams will be removed upon the completion of the construction of the Gallipolis navigation project, which likewise has been authorized by plaintiff and is now under construction.

Defendant admits that the Kanawha River is at the present time a navigable river of the United States, and that plaintiff has adopted a plan for a nine-foot channel on the said river to connect with the Ohio River, but denies that said plan contemplates a nine-foot channel to Kanawha Falls and avers that the head of navigation on the Kanawha River is at, and under the said plan will remain at, a point which is approximately five miles downstream from Kanawha Falls, approximately six miles downstream from the junction of the Gauley and the New Rivers and approximately 155 miles downstream from the Radford project.

Defendant admits that Congress authorized the War Department to construct the London and Marmet dams, but avers that said House Document No. 190, 70th Congress, First Session, should be introduced in its entirety, and made to speak for itself, and, if material in the pleadings, defendant prays leave to refer to said document for a correct statement of its contents.

Defendant admits all of the remaining allegations of paragraph (8) except that it denies any knowledge or information sufficient to form a belief as to the purpose or intent of the Congress in passing the Rivers and Harbors Act of July 3, 1930 (46 Stat. 928), which Act authorized the construction of the London and Marmet dams. Defendant avers that, even if the said remaining six dams should be in existence upon the completion of the Radford
51 project, the operation of said project would not interfere with navigation on or the navigable capacity of the Kanawha River; defendant avers that the said Winfield and Gallipolis navigation dams are planned by plaintiff to be of the same general design and character of construction as are the said London and Marmet navigation dams.

9. Answering paragraph (9), defendant denies each and every allegation of said paragraph except that defendant admits the present navigability of the Ohio River and the downstream 90 miles of the Kanawha River, and says that as regards New River and the other tributaries of the Kanawha River no navigation locks and dams are under construction and none has been authorized by Congress or even recommended by the War Depart-

ment, and further avers that, even if it were practicable and economical to improve New River for the purpose of creating navigation or navigability by artificial means, which defendant denies, nevertheless such improvement could not be made without acquiring defendant's property rights by due process of law and upon just compensation being paid defendant, and that the possibility of making all or any part of New River navigable by artificial means, if it existed, would not make the New River a navigable water of the United States.

10. Answering paragraph (10), defendant is advised that all of the allegations of said paragraph are immaterial, argumentative, irrelevant, impertinent, and evidentiary, even if competent as evidence, and hence need not be answered.

Nevertheless, to avoid delay but without waiving the foregoing objections, defendant, answering, avers that it is without knowledge as to whether the route mentioned in paragraph (10) of the Bill was ever recommended to Congress for improvement. Defendant says that the scheme apparently referred to in said paragraph involved solely artificial waterways, expected and intended to be created in large part by canalization of creeks and other nonnavigable steams and by the construction of canals over dry land, including the construction of a tunnel about eight miles long through the main range of the Allegheny mountains, and was in fact chimerical and was quickly so recognized, that no work was ever done or authorized thereon and that the scheme was abandoned.

52 Defendant denies that it ever was practicable or economical to develop a waterway between the James and Kanawha Rivers, and denies that it was ever practicable to make New River a useful part of the Mississippi River system of the navigable waters of the United States or any other system, and denies that it was ever, or is now, practicable to overcome the natural obstructions to navigation in New River by locks, canals, and dams, or otherwise, but says that, even if it were practicable to make New River navigable by artificial means, that possibility would not make New River a navigable water of the United States or affect the rights of the parties in this suit.

Defendant further avers that the scheme referred to in paragraph (10), even if it had been carried out, could have no bearing upon or relation to this alleged cause of action against this defendant for the reason that the Radford project site is approximately 90 miles upstream from any point on the alleged route.

11. Answering paragraph (11), defendant is advised that all of the allegations of said paragraph are immaterial, argumenta-

tive, irrelevant, impertinent, and evidentiary, even if competent as evidence, and hence need not be answered.

Nevertheless, to avoid delay but without waiving the foregoing objections, defendant, answering, denies that New River has always been recognized and treated by the plaintiff or by the State of Virginia or by the State of West Virginia as navigable. Defendant expressly avers that New River is not and never has been navigable-in-fact and is not and never has been a navigable waterway of the United States, and further avers that, even assuming that New River had at some time or another been recognized and treated by the State of Virginia or the State of West Virginia as navigable, which defendant, upon information and belief, denies, such fact would be irrelevant and have no bearing upon this alleged cause of action because the supposed navigability, if any, would have been such only under the laws of the respective States and would not constitute the
53 navigability-in-fact for interstate commerce which is the requisite for a navigable water of the United States and also because Federal navigability cannot be created by legislative fiat, whether State or Federal.

Defendant denies that the Congress ever recognized New River as navigable and says that the most that the Congress has ever done is to consider and attempt the creation of limited navigability in New River by artificial means, which attempts were never effective artificially to create local navigability even in isolated sections of said river. Defendant avers that subsequently the Congress formally abandoned such attempt to create such limited navigability by artificial means.

Defendant denies that it has any knowledge or information sufficient to form a belief as to the recommendations, or reasons for recommendations, if any, which the United States Geological Survey may have made for the purchase of lands under the Week Act within the watershed of New River or as to whether such recommendations, if any were ever made, were ever adopted or approved by Congress or as to the plaintiff's purchases in the Unaka National Forest, or as to the policy and plans of the National Forest Reservation Commission in respect thereto or as to whether such plans, if any, were ever approved or authorized by Congress. Defendant denies that any quantity of land even remotely approximating 54,000 acres has been so purchased within the New River watershed and defendant avers that nothing which defendant proposes to do or can do in connection with the Radford project can in any way affect the lands so purchased or impair the objects for which the same may have been purchased.

Defendant admits that Chiefs of Engineers of the United States Army from 1873 to 1913 made surveys and reports respecting New River but denies that plaintiff has fully or correctly stated the substance of such reports and if such reports be competent and material and properly referred to in the Bill of Complaint as defendant is advised they are not, then defendant prays leave to refer to official copies of such reports for a full and correct statement of their contents, and defendant denies that New River is now or ever has been a navigable waterway of the United
54 States and denies that New River has ever carried useful commerce, even intrastate, of any substantial character. Defendant further avers that plaintiff has failed to allege pertinent reports of engineers of the War Department respecting the navigability of New River, several of which expressly state that New River is nonnavigable, and some of which were made officially to the Federal Power Commission, at the instance of which this suit has been brought.

Defendant admits that between the years 1876 and 1886 Congress appropriated a total of $112,000, but denies any knowledge or information sufficient to form a belief as to whether Congress in so doing was acting on the recommendation of its engineers and avers that the purpose of said appropriation was artificially to create limited navigability on the nonnavigable New River.

Defendant admits that the greater part but not all of said appropriations was expended but denies that the purpose of said expenditures was other than as above stated and denies that the effect of said expenditures was to improve the New River for navigation from points in Virginia to points in West Virginia, or in any sections at all of its course. Defendant avers that the attempt to create artificial, local, and limited navigability on New River was found by Congress to be impracticable and uneconomical and that consequently Congress, by the Rivers and Harbors Act of June 13, 1902, repealed all previous provisions of law authorizing the work and ordered that all amounts theretofore appropriated and remaining unexpended be paid into the Treasury of the United States and says that the work done under such appropriations prior to their repeal was ineffective to make New River or any part thereof navigable in fact.

Defendant admits that careful search will still reveal some trace of plaintiff's attempts to create artificial navigability on New River but denies that such attempts were successful in creating artificial navigability.

Relying specifically to the allegations that certain channels are not now extensively used, defendant avers that they are not
55 used at all, that they were never practically useful for interstate commerce nor for local, intrastate commerce of

any substantial character, and that any attempts to create artificial, limited, local, and intrastate navigability, if relevant, which defendant denies, were inconsequential and ineffectual. Defendant denies that the reason for lack of use of New River for navigation is competition of railroads and of commodities in other regions, and denies any knowledge or information sufficient to form a belief as to whether accumulations of silt, if any, could be easily removed, but denies that the accumulation of silt, if any, is the cause of the nonnavigable character of New River, and avers that New River because of its natural characteristics, and in spite of any attempt to modify them, is and always has been incapable of being used or useful in interstate or foreign commerce and that it would be impracticable and uneconomical to attempt to create artificial navigability.

Upon information and belief defendant denies that in 1872 any Board of Engineers acting under the authority of Congress made a report and recommendation on the feasibility of a canal and waterway utilizing and joining the James and New Rivers and avers that a Board of Engineers made a report in the year 1874 and, if the 1872 report alleged by plaintiff is an incorrect reference to the 1874 report and if such latter report is competent and material to this action, which defendant denies, then defendant denies that plaintiff has fully or correctly stated the circumstances surrounding or the substance of said report, and defendant says that, if said report is competent and material and properly referred to in the Bill, as defendant is advised and believes it is not, then defendant prays leave to refer to an official copy of said report for a full and correct statement of its contents. Defendant further avers that proof of the surrounding circumstances is essential to a proper understanding and interpretation of said report. Defendant further avers that, even were plaintiff's allegations concerning the said report sufficiently full and correct, nevertheless such report could have no bearing upon or relation to this
56 alleged cause of action against this defendant for the reason that the Radford project site is approximately 90 miles upstream from any point on the alleged fanciful canal and waterway scheme which never materialized.

Defendant upon information and belief denies that Congress has recognized New River as navigable by any special statute and says that in any event navigability is a question of fact and cannot be created by Congressional fiat.

12. Answering paragraph (12), defendant is advised that all of the allegations of said paragraph are immaterial, argumentative, irrelevant, impertinent, and evidentiary, even if competent as evidence, and hence need not be answered.

Nevertheless, to avoid delay but without waiving the foregoing objections, defendant, answering, admits the appointment of a commission, headed by John Marshall, but denies that plaintiff has fully or correctly stated the substance of that commission's report and defendant says that, if said report is competent and material and properly referred to in the Bill, as defendant is advised and believes it is not, then defendant prays leave to refer to an official or authenticated copy of said report for a full and correct statement of its contents.

Defendant admits that the General Assembly of Virginia besought the aid of Congress but denies the materiality thereof.

Defendant denies that the corporations, or either of them, which were aided, respectively, by the Acts of the General Assembly of the State of Virginia of February 24, 1823, and March 2, 1853 (not 1855), were formed "for the purpose of constructing the James River-Kanawha Canal," and avers, on the contrary, that the corporate purposes for which that corporation (the James River Company) referred to in said Act of 1823 was formed were to render the Great Kanawha River navigable for boats drawing three feet of water from the great falls thereof to the Ohio River, to improve the navigation of the James River by locks and navigable canals from tidewater to the mouth of Dunlaps Creek where the City of Covington, Virginia, is situate, and to construct
57 a road from the mouth of Dunlaps Creek to the great falls of the Kanawha River (an airline distance of about 70 miles—the actual distance would have been much greater), and avers that the corporate purpose for which that corporation (the James River and Kanawha Company) referred to in said Act of 1853 was formed to connect the tidewater of James River with the navigable waters of the Ohio River by one of three plans of improvement at the election of the company, viz, first, to continue the lower James River canal upstream to some point on said river not lower than Lynchburg, to construct a railroad from the western termination of that canal to some point on the Great Kanawha River below the great falls thereof, and to improve the Kanawha River thence to the Ohio, so as to make it suitable for steamboat navigation, or, second, to continue the James River canal as aforesaid and build a railroad from its western termination to the Ohio River, or, third, to build a railroad from Richmond to the Ohio River. Defendant avers that no work of attempted creation of artificial navigability was ever done by either of these corporations or anyone along any such route on either New River or its tributary the Greenbrier.

13. Answering paragraph (13), defendant is advised that all of the allegations of said paragraph are immaterial, argumentative, irrelevant, impertinent, and evidentiary, even if competent as evidence, and hence need not be answered.

Nevertheless, to avoid delay but without waiving the foregoing objections, defendant, answering, denies each and every allegation of said paragraph except that defendant admits the appropriation of $30,000 by the State of Virginia by an Act of the General Assembly passed December 18, 1861, as a war measure for the purpose of creating sufficient artificial navigability to permit the movement under urgent war necessity of military stores in batteaux from some point at or near the central depot on the Virginia and Tennessee Railroad to the mouth of the Greenbrier River, but defendant denies any knowledge or information sufficient to form a belief as to whether the said appropriation was so expended and avers that any work done in this connection
58 was ineffective and utterly failed to create even artificial navigability of a limited and local character. Defendant is without knowledge as to whether the Legislature of the State of West Virginia by a joint resolution of September 21, 1872, memorialized Congress in respect of a canal between the Kanawha and James Rivers, but avers that in any event no construction work ever resulted therefrom. Defendant avers that none of such expenditures and none of such legislative acts or resolutions resulted in the creation or establishment of any navigability in any part of New River.

14. Answering paragraph (14), defendant is advised that all of the allegations of said paragraph are immaterial, argumentative, irrelevant, impertinent, and evidentiary, even if competent as evidence, except the allegations that New River and Kanawha River are navigable waters of the United States, which allegations are redundant and repetitious, and that hence none of said allegations need be answered.

Nevertheless, to avoid delay but without waiving the foregoing objections, defendant, answering, denies each and every allegation of said paragraph except that defendant admits that the Kanawha River is presently navigable but only up to a point about 5 miles downstream from Kanawha Falls; admits that there are falls, shoals, and rapids in the New River; and admits that the New River has been investigated by Chiefs of Engineers of the United States Army and by other engineers and that some of such engineers have recommended that work be done on the river in various stretches thereof, but defendant avers that others of such engineers of plaintiff have recommended that, because of the impossibility of creating artificial navigability therein by the expenditure of any reasonable sum of money, no work be done on said river.

15. Answering paragraph (15), defendant admits the allegations of said paragraph except as follows: Defendant denies that New River is a navigable river of the United States; defendant

denies that the operation of the Radford project will at any time result in leaving the bed of New River dry or practically dry; defendant denies that it could render navigation on New River impossible by any manner of operation of the Radford project, for the reason that New River in its natural and in its
59 present condition is nonnavigable and not susceptible of being used as a highway in interstate commerce; and defendant further denies that it is violating any law. Defendant avers that authorization by Congress or any other agency of plaintiff is not necessary for this project, but says that were any authorization under the Rivers and Harbors Act of March 3, 1899, necessary for defendant's project, which defendant denies, then said project has been authorized as provided by said statute. Defendant is informed and believes and, therefore, avers that the Chief of Engineers of the United States Army and the Secretary of War have, so far as the interests of navigation are concerned, approved the general plans upon which the defendant is now constructing its dam at the site of the Radford project and that the Federal Power Commission tendered the defendant a license for the construction of a water power project at the site of the Radford project upon the identical plans so approved as aforesaid and upon which plans the defendant is now constructing said Radford project. Defendant avers that neither the construction nor operation of its project will interfere with or obstruct navigation on or the navigable capacity of any navigable waters of the United States.

16. Answering paragraph (16), defendant admits that Kanawha River is a navigable water of the United States up to about 5 miles below Kanawha Falls and that within such present limits the navigability of that river is now under improvement. Defendant admits that intermittent storage and release of the waters of New River at the Radford dam could set up fluctuations in the flow which in rapidly lessening degree might be transmitted to portions of New River downstream from the dam and under some circumstances might be perceptible even to Kanawha River but not of such character or extent as to interfere with navigation or navigable capacity, and denies that it will intermittently store and release large quantities of water whenever it is profitable to do so and without regard to any needs of navigation or in violation of its declared intention not so to operate its project; and denies that in any case any fluctuations in flow from the Radford project will or can be trans-
60 mitted downstream so as to diminish, impair, or obstruct the navigable capacity of the Kanawha River or any other navigable water of the United States. Defendant admits that the construction of the Radford project has been started and

is being continued by it, that the dam will be across New River and that such construction has never been specifically authorized by Congress. Defendant avers that authorization by Congress or any other agency of plaintiff is not necessary for this project but says that were any authorization under the Rivers and Harbors Act of March 3, 1899, necessary for defendant's project, which defendant denies, then said project has been authorized as provided by said statute. Defendant is informed and believes and therefore avers that the Chief of Engineers of the United States Army and the Secretary of War have, so far as the interests of navigation are concerned, approved the general plans upon which the defendant is now constructing its dam at the site of the Radford project and that the Federal Power Commission tendered the defendant a license for the construction of a water-power project at the site of the Radford project upon the identical plans so approved as aforesaid and upon which plans the defendant is now constructing said Radford project. Defendant is advised and believes and therefore avers that plaintiff is not now attempting and does not even contemplate any attempt to improve the physical condition of New River in order to create artificial navigability.

Defendant denies each and every other allegation contained in said paragraph.

Defendant avers that neither the construction nor operation of its project will interfere with or obstruct navigation or the navigable capacity of any navigable water of the United States.

17. Answering paragraph (17), defendant admits all the allegations of said paragraph except that defendant denies that that it will operate said project in accordance with the so-called schedules authorized by the license issued to defendant by the State of Virginia if such method of operation would interfere with or obstruct the navigable capacity of any navigable
61 waters of the United States; avers that it intends to and will construct and operate said project in such a manner as will not so interfere with or obstruct; denies that there is any specific method of operation of the project prescribed in said State license except in the sense that the State Corporation Commission has required that downstream from the Radford project there shall always be at least a specified flow in New River; avers that the said State Water Power Act contains the requirement that defendant may not operate the project so as to interfere with the exercise of lawful jurisdiction of the United States; denies that New River is navigable; and further avers that, even if the minimum quantities of water set forth in said State license represented the actual quantities which would be so released, which defendant denies, nevertheless the quantities of water so

released would not be inadequate from the standpoint of navigability and would not result in diminishing or impairing or causing obstruction to the navigability of any navigable waters of the United States.

18. Answering paragraph (18), defendant admits every allegation of said paragraph except that the Declaration of Intention was filed on or about June 26, 1925, and not June 26, 1926, as alleged by plaintiff.

19. Answering paragraph (19), defendant admits every allegation of said paragraph.

20. Answering paragraph (20), defendant denies any knowledge or information sufficient to form a belief as to what investigations, examinations, and studies of defendant's project were made or caused to be made by the Federal Power Commission except that defendant admits that said Commission did request Chiefs of Engineers, United States Army, to report on said project described in the Declaration of Intention and admits that several Chiefs of Engineers made reports on and expressed opinions regarding said project and defendant avers that the finding made June 1, 1927, by said Commission, referred to in said paragraph (20), to the extent hereinafter set forth is contrary to and unsupported by the reports of the Chiefs of Engineers.

62 Defendant admits that a hearing was held by the Federal Power Commission March 2, 1926, and avers that on or about February 16, 1931, there was held another hearing but that the scope of such latter hearing was limited as hereinafter set forth.

Defendant admits that the Federal Power Commission purported to make a finding on June 1, 1927, and avers that that part of said finding which states that New River is not navigable waters truly states the fact in that regard and is correct, proper, and lawful but denies that that part of said finding which states that the interests of interstate or foreign commerce would be effected by the Radford project states a fact or is correct, proper. or lawful.

Defendant avers that at said hearing of March 2, 1926, the only evidence before the Commission as to the effect the said project would have on navigation was the report of the Chief of Engineers addressed to the Federal Power Commission, dated December 29, 1925, which report was read into the record of the hearing by counsel for defendant's predecessor, New River Development Company, and which report stated *inter alia* as follows:

"Therefore, so far as can be predicted from available data and records it would not be possible to operate the proposed project so as to adversely affect navigation on the Kanawha River under the existing project.

"I, therefore, report that in my opinion New River in its present condition is not a navigable stream and that navigation on the Kanawha River will not be adversely affected by the proposed development";

and defendant avers that no other evidence was before said Commission at said hearing; and defendant avers that at said hearing counsel for said New River Development Company stated that, if there was any other evidence which the Commission might have, said Company was entitled to and desired an opportunity of examining and rebutting such evidence, and avers that at said hearing inquiry was made by defendant's predecessor as to whether the said report of the Chief of Engineers was to be questioned by the Commission, said predecessor company stating that in such event it desired to be heard further with respect to the same;

63 and defendant further avers that said Commission at said hearing did not question the facts and conclusions stated in said report of December 29, 1925, and no evidence was offered or received in opposition to or contradictory of the facts and conclusions set out in said report.

Defendant avers that, if any evidence as to the matters involved (as they appear in the alleged finding of June 1, 1927) other than said report of the Chief of Engineers was ever taken, received, or examined by the Federal Power Commission prior to making its said finding, there was no proper, adequate, or lawful hearing thereon, in that such other evidence was taken or received secretly and ex parte and was examined ex parte by the Commission without giving to defendant notice or an opportunity to be heard, and avers that a finding based on evidence taken, received, and considered secretly and ex parte without giving the defendant notice or opportunity to be heard in connection with the same and without giving the defendant notice or opportunity to meet and refute such evidence is arbitrary, capricious, unlawful, void and a denial of due process of law in contravention of the Fifth Amendment of the Federal Constitution.

Defendant avers that, if no evidence other than said report of the Chief of Engineers was examined by said Commission, then, even though there may have been a proper and lawful hearing, there is no evidence to support the finding that said project would affect the interests of interstate or foreign commerce but, instead, said finding is clearly contrary to all the evidence and said finding is therefore arbitrary, capricious, unlawful, void, and a denial of due process of law in contravention of the Fifth Amendment to the Constitution of the United States.

Defendant avers that the said hearing of February 16, 1931, was not held for the purpose of considering any further evidence

or any evidence at all and was not a rehearing and that said hearing was limited to arguments concerning the extent of jurisdiction, if any, of the Federal Power Commission under the Federal Water Power Act and the Constitution of the United States over the Radford project located on the nonnavigable New River and involving no land or other property of the United States. Defendant is without knowledge as to any rehearing in regard to any evidence upon which the said Commission's finding of June 1, 1927, was based.

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Amendment inserted before last paragraph in paragraph numbered 20 of the answer, pursuant to the order of December 9, 1935:

"Defendant admits that the Federal Power Commission purported to make a finding on October 12th, 1932, but avers that this alleged finding, whereby said Commission declared New River to be navigable within the meaning of Section 3 of the Federal Water Power Act, was made not only without an adequate or lawful hearing, but made without any hearing whatsoever and that said alleged finding was not based upon or made with reference to nor responsive to the declaration of intention theretofore filed by the defendant with said Commission, and that, as defendant is informed and believes and therefore alleges, said pretended finding was not based upon the reception and consideration of any evidence whatsoever, and was made without receiving or considering any evidence, but that such evidence, if any, as was taken or received with respect to said alleged finding was taken and received secretly and ex parte and was examined ex parte by the Commission without giving the defendant any notice or any opportunity to be heard, and defendant avers that said purported finding of October 12th, 1932, was merely a self-serving declaration made by said Commission after a suit had been instituted against the members of the Commission by the defendant herein to be thereafter offered and used in said suit as 'official' or 'record' or 'documentary evidence,' in behalf of said members in said suit; that a purported finding of a self-serving nature, based on evidence taken, received and considered secretly and ex parte (if based upon any evidence or consideration thereof at all) without giving the defendant notice or opportunity to be heard in connection with the same and without giving the defendant notice or opportunity to meet and refute such evidence, is arbitrary, capricious, unlawful, void, and a denial of due process of law, in contravention of the Fifth Amendment of the Constitution of the United States.

"Except as hereinbefore expressly admitted or alleged, defendant denies any knowledge or information sufficient to form a belief regarding any of the other alleged findings referred to in said paragraph 20 of the Bill as amended."

Defendant denies each and every other allegation in said paragraph.

21. Answering paragraph (21), defendant is without knowledge of any rehearing before the Federal Power Commission upon the facts or for the submission or taking of evidence and denies each and every other allegation of said paragraph.

22. Answering paragraph (22), defendant admits the allegations of said paragraph except as follows: Defendant is
65 without knowledge of any rehearing before the Federal Power Commission upon the facts or for the submission or taking of evidence. Defendant denies that the Federal Power Commission ever made a lawful finding that the Radford project would affect the interests of interstate or foreign commerce. Defendant denies that it intends to or will cause variations in stream flow at the site of said Radford project such as would cause interference with the flow of water into the pools created by any navigation dams or as would or could diminish or obstruct the navigable capacity of any of the waters of the United States and says that any variations in flow which may occur at the dam-site will rapidly diminish in degree below the dam and that if any should ever be perceptible in Kanawha River they will be inconsequential and will not cause any interference with navigation works or pools or diminish or obstruct the navigable capacity of said river. Defendant denies that the construction or operation of the Radford project will violate any law.

23. Answering paragraph (23), defendant denies each and every allegation of said paragraph except that defendant admits that its predecessor filed a Declaration of Intention under Section 23 of the Federal Water Power Act and that said Declaration of Intention was subsequently on or about September 2, 1926, assigned to and thereupon adopted by defendant; and defendant admits that it requested a finding by the Federal Power Commission and says that defendant did so for the purpose of obtaining, in accordance with the clear facts, a finding that neither the construction nor operation of defendant's project would affect the interests of interstate or foreign commerce. Defendant admits that said agency of plaintiff purported to make a finding that the proposed construction would affect the interests of interstate and foreign commerce, but defendant says that said purported finding was and is unsupported by the evidence, contrary to all of the evidence received by or offered before the Federal Power Commission at any hearing regarding said Radford project, contrary
66 to the fact, unlawful and void, a denial of due process of law and, if said finding affects defendant's rights, a taking of defendant's property without due process of law, all contrary to and in violation of the Fifth Amendment to the Constitution of the United States.

24. Answering paragraph (24), defendant denies any knowledge or information sufficient to form a belief as to any amounts expended by plaintiff in the acquisition of riparian lands and admits that the London and Marmet dams have been constructed and that the Winfield dam is being constructed, and admits that the Federal Power Commission has issued a license to the Kanawha Valley Power Company for the generation of hydroelectric power at the London and Marmet dams. Defendant denies that the compensation to be paid by said licensee is based upon the flow of water at said dams available for producing power and avers that said flow could only have been one of a number of factors considered in fixing said compensation. Defendant admits that compensation under Section 10 (e) of the Federal Water Power Act (16 U. S. C. 803) in the future, i. e., 20 years after issuance of license, may be affected in accordance with variations in the volume and value of said flow for the purpose of generating hydroelectric power but defendant avers that the operation of the Radford project will not cause violent nor even detrimental variations in the volume and value of said flow or changes in the pool levels. Defendant denies each and every other allegation contained in said paragraph.

25. Answering paragraph (25), defendant denies each and every allegation of said paragraph except that defendant admits that it has begun the construction of the Radford project and is continuing the constructing of the same.

26. Answering paragraph (26), the defendant denies that the plaintiff has correctly construed or fully or correctly stated the purposes, terms, or substance of the Federal Water Power Act or of the other laws referred to in said paragraph. Defendant prays leave to refer to the texts of said Acts for a full and correct statement of their terms. Defendant further says that, if said Acts could properly be construed as set forth by the plaintiff in
67 this paragraph, the application of such Acts to the project of the defendant would deprive defendant of its property without due process of law and said Acts would be void as in contravention of the Fifth and Tenth Amendments to the Constitution of the United States. The defendant denies each and every other allegation contained in said paragraph.

27. Answering paragraph (27), defendant is advised that some of the allegations of said paragraph are immaterial, argumentative, irrelevant, impertinent, and evidentiary, even if competent as evidence, and hence need not be answered.

Nevertheless, to avoid delay but without waiving the foregoing objections, defendant, answering, denies any knowledge or information sufficient to form a belief as to the studies or plans which plaintiff has caused to be made or is considering and draft-

ing for the development of what plaintiff terms a New-Kanawha River system.

Defendant denies that the proper development of said streams, or either of them, requires that the selection of dam sites and of structures to be located thereon and therein be coordinated under the control of the plaintiff, but is informed and believes and therefore avers that so far as its Radford project is concerned, the selection of the dam sites and the general plans of the structures to be located therein have, insofar as the interests of navigation are concerned, been approved by the Chief of Engineers of the United States Army and by the Secretary of War.

Defendant denies any knowledge or information sufficient to form a belief as to whether or not said Radford project is adapted to fit into the alleged but unspecified plans of plaintiff, including any plan which plaintiff may have to attempt to create artificial navigability on New River, but defendant avers that inasmuch as New River neither had nor has navigation nor navigable capacity in its natural or existing condition, there is no navigation which can be improved, and further avers that artificial navigability could be created only by the expenditure of an unjustifiable and prohibitive amount of money and by acquiring the necessary property rights of defendant and other riparian owners
68 along said New River upon the payment of just compensation.

Defendant denies that the construction and operation of its Radford project will interfere with the navigable capacity of the Kanawha River or plaintiff's present plans for improving the same.

Defendant admits that it has made no plans for the construction or operation of locks at its dam and proposes not to make any such provision, but defendant avers that the license tendered to defendant by the Federal Power Commission for said Radford project and refused by defendant contains no requirement for the construction of locks at its dam, and further defendant is informed and believes and therefore avers that the general plans for its dam, which plans contain no provision for locks, have, insofar as the interests of navigation are concerned, been improved by the Chief of Engineers of the United States Army and by the Secretary of War.

Defendant admits that it proposes not to contribute toward the construction of headwater improvements.

Defendant denies that it will interfere with any existing or prospective navigation or water-borne commerce or with the navigable capacity of any navigable waters of the United States.

Defendant denies each and every other allegation contained in said paragraph.

28. Answering paragraph (28), defendant denies each and every allegation contained in said paragraph.

29. Answering paragraph (29), defendant denies each and every allegation contained in said paragraph.

30. Answering paragraph (30), defendant admits that, if all of the allegations of the Bill of Complaint were true and a good cause of action were stated in favor of the plaintiff and against the defendant in said Bill, the plaintiff would be without adequate remedy at law, but defendant says no cause of action attempted to be stated in said Bill is well grounded; and the defendant denies every allegation of the Bill not expressly admitted by this Answer.

31. For a first separate and complete defense, defendant
69 avers that its Radford project requires and involves the use or submerging in excess of 5,000 acres of land situated in and along the nonnavigable New River in Pulaski County, Virginia, that it now owns or controls substantially all of the requisite lands and rights and that by far the greater part of said lands are owned by defendant in fee simple; that said project requires the use of no land or other property of the United States; that said lands and rights are of great value and were acquired solely for the purpose of said water-power development at a cost in excess of $1,000,000; that the chief value to the defendant of such lands and rights resides in their adaptability and utility for water-power development; that as the owner of said lands and rights the defendant has a full, perfect, and complete proprietary right to construct the Radford water power project, subject only to such regulation as the State of Virginia may constitutionally exercise under its police power; that the right and permission to construct, operate, and maintain said Radford project are and have been conferred on the defendant by the laws of the State of Virginia and the defendant has complied with all the laws of Virginia necessary to the exercise of its proprietary right to construct, operate, and maintain said project; and that such compliance with the laws of Virginia constitutes full, adequate, and complete authority for the construction, operation, and maintenance of the Radford project, which is located wholly within the confines of the State of Virginia on the New River, a nonnavigable stream, and which does not involve the use of land or other property of the United States.

32. For a further separate and complete defense, defendant repeats and reavers each and every allegation contained in paragraph 31 and avers that neither the said Federal Water Power Act nor the said Rivers and Harbors Act of March 3, 1899, nor any other Federal statute authorizes or empowers the Federal Power Commission or any other agency of the United States to require

defendant under any circumstances to have or accept any Federal license, permit, or other affirmative authorization whatsoever as a condition of exercising its property rights to construct, maintain, and/or operate said Radford project which is located upon the nonnavigable New River and does not involve the use of any land or other property of the United States; and avers that, if said Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute be properly construed to confer upon the Federal Power Commission or any other Federal agency jurisdiction over the Radford project to require defendant to accept any Federal license permit or any other affirmative authorization as a condition of the exercise of its property rights to construct, maintain, and/or operate the Radford project, then each of said Acts, if so construed, is to that extent unconstitutional and void and in violation of the Fifth and Tenth Amendments to the Constitution of the United States.

33. For a further separate and complete defense, defendant repeats and reavers each and every allegation contained in paragraph 31 and avers that said Radford project is located on a nonnavigable stream, does not involve the use of any land or other property of the United States and will not cause any obstruction to the navigable capacity of any navigable waters of the United States, and that the Federal Power Commission has no jurisdiction, authority, or right to find that the interests of interstate or foreign commerce will be affected by the proposed construction mentioned in any Declaration of Intention filed under the provisions of the second paragraph of Section 23 of the Federal Water Power Act unless it shall first have determined that the project is situated in or upon navigable waters of the United States; that, when the Federal Power Commission made a finding that the defendant's Radford project was to be constructed, as it is being constructed, upon a nonnavigable stream, then said Federal Power Commisison had no jurisdiction, authority, or right to find that the interests of interstate or foreign commerce would or might be affected by the construction of said project; that, therefore, the purported finding of said power Commission, that the construction of the defendant's Radford project would or might affect the interest of interstate or foreign commerce (even had it not been unsupported by the evidence and contrary to the evidence, as it was), was *ultra vires*, beyond the jurisdiction of said Commission, unlawful and void; and that any restriction of defendant's use of its property through or by virtue of such a finding is a taking of defendant's property without due process of law in contravention of the Fifth Amendment to the Constitution of the United States.

34. For a further separate and complete defense, defendant repeats and reavers each and every allegation contained in paragraph 31 and avers that, even if the Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute may properly be construed to confer upon the Federal Power Commission or upon any other Federal agency any jurisdiction over a proposed water-power development to be located on a nonnavigable stream and not involving the use of any land or other property of the United States, then, by the terms of said Acts and constitutional limitations upon Federal power, said jurisdiction can exist and attach only when and to the extent that it affirmatively and definitely appears that said water-power development will affect the interests of interstate or foreign commerce; that, in order to determine whether the Radford project, which is located on a nonnavigable stream approximately 155 miles above the head of navigation, which does not involve the use of land or any other property of the United States and which is being constructed and will be operated without any affirmative consent from the United States, violates the Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute, it is necessary to determine whether the intended acts of defendant substantially interfere with or obstruct navigation on or the navigable capacity of the Kanawha River, which is the only navigable water of the United States which conceivably could be affected; that New River Development Company, defendant's predecessor, for the purpose of obtaining, in accordance with the clear facts, a determination that said Radford project is not subject to the jurisdiction
72 of the Federal Power Commission under the Federal Water Power Act, filed with said Commission, pursuant to Section 23 of said Act, a Declaration of Intention to construct, operate and maintain its Radford project; that said Declaration of Intention includes the specific statement that

"The proposed project will be constructed and operated so as not to impair the navigable capacity of the stream below, nor to affect the interests of interstate or foreign commerce";

that said declared intention has never been withdrawn or modified or changed in any respect and remains the actual and expressed intention of defendant; that said statement of intention was made in good faith; that the carrying out of said intention is feasible; that the intended acts of defendant show that there will be no interference with navigation on or the navigable capacity of any navigable waters of the United States; and that any restriction of defendant's use of its property by the plaintiff's agencies under the aforesaid facts constitutes a taking of defendant's property with-

out due process of law in contravention of the Fifth Amendment to the Constitution of the United States.

35. For a further separate and complete defense, defendant repeats and reavers each and every allegation contained in paragraphs 31 and 34 hereof as though the same were set forth at length herein and avers that it would be physically impossible for the defendant to construct and/or operate the Radford project so as to create any obstruction to the navigable capacity of any navigable waters of the United States.

36. For a further separate and complete defense, defendant repeats and reavers each and every allegation of paragraphs 31, 34, and 35 and avers that, if the Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute be construed to confer jurisdiction upon the Federal Power Commission or any other Federal agency to require the defendant to have or accept a Federal license, permit or authorization of any character as a condition of the exercise of its property right to construct said Radford project, which is located on a nonnavigable stream, does not involve the use of any land or other property of the United States and does not affect the interests of inter-
73 state or foreign commerce, then each of said Acts, if so construed, to that extent violates the Fifth and Tenth Amendments of the Constitution of the United States and is unconstitutional and void.

37. For a further separate and complete defense, defendant repeats and reavers each and every allegation contained in paragraph 31 and avers that New River is a nonnavigable stream; that the part of the finding (made by the Federal Power Commission on or about June 1, 1927, and affirmed by an opinion and order of said Commission on or about April 3, 1931) which states that the New River in the part thereof involved in said Declaration of Intention is not "navigable waters" within the definition thereof as contained in said Federal Water Power Act is correct and proper; that the part of said finding (likewise made on or about June 1, 1927, and affirmed by the opinion and order rendered on or about April 3, 1931) which states that the interests of interstate or foreign commerce would be affected by such proposed construction is erroneous, unlawful, arbitrary, and wholly unsupported by the evidence, is contrary to the evidence and facts existing at the present time or at the time said finding was made and is contrary to the declared intention of defendant, and in any event said part of said finding is not conclusive or binding and, if material, is for determination de novo by this Court; that, if it should appear that said finding is supported by any evidence, which defendant denies, said finding is contrary to the manifest weight of the evidence; and that the part of said finding which

states that the interests of interstate or foreign commerce would be affected by such proposed construction constitutes a denial of due process of law and a taking of defendant's property in violation of the Fifth Amendment to the Constitution of the United States.

38. For a further separate and complete defense, defendant repeats and reavers each and every allegation of paragraph 31 and avers that, even if said Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute
74 may properly be construed to authorize and empower the Federal Power Commission or any other Federal agency to issue and to require the acceptance by defendant of any Federal license, permit or authorization as a condition of exercising its property right to construct, maintain and/or operate said Radford project, which is located upon a nonnavigable stream and does not involve the use of any land or other property of the United States, nevertheless said Federal license, permit or authorization must be limited to and contain conditions relating solely to the protection of the interest of the United States in interstate or foreign commerce, or, more specifically, to the protection of the navigable capacity of the navigable waters of the United States; that, if said Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute be construed to confer jurisdiction on the Federal Power Commission or any other Federal agency to issue to, and to require the defendant to accept, as a condition of its property right to construct, maintain, and/or operate said Radford project, a Federal authorization, permit or license (such as the license tendered defendant by said Commission on or about July 1, 1927, or the one tendered on or about May 5, 1931) containing conditions other than those relating solely to the protection of the interest of the United States in its navigable waters, then each of said Acts, if so construed, is to that extent unconstitutional and void and in violation of the Fifth and Tenth Amendments to the Constitution of the United States.

39. For a further separate and complete defense, defendant repeats and re-avers each and every allegation contained in paragraphs 31 and 38 and avers that on or about February 4, 1930, defendant, although challenging the existence of any jurisdiction in the Federal Power Commission over the Radford project, offered to accept a Federal license containing solely such conditions, regarding the manner of construction or operation of the project, as are necessary and appropriate to prevent any substantial interference with the navigable capacity of the Kanawha River such as would be unlawful under the Rivers and Harbors Act of March 3, 1899; that on or about September 22, 1930, the then Attorney General of the United States
75 in an official opinion advised the Federal Power Commission that it is not required by the terms of the Act to

insert in a license for defendant's project any conditions (except the 50-year limitation upon duration) which are not necessary or appropriate in the protection of navigation of the Kanawha River and that to insert such conditions would raise grave constitutional questions; that, notwithstanding the opinion of the Attorney General, the said Commission on or about April 3, 1931, issued an order which denied the defendant's application for a license containing solely conditions necessary or appropriate to protect the navigable capacity of any navigable waters of the United States and which ordered this defendant not to proceed with the construction of the Radford project unless and until it shall have received a standard form of license, containing *inter alia* all of the conditions provided by the Federal Water Power Act for projects on navigable waters of the United States and regardless of whether such conditions have any real or substantial relation to the protection of the navigable capacity of any navigable waters of the United States; that on or about the 5th day of May, 1931, the Federal Power Commission tendered such a license to defendant which license defendant refused to accept; that said tendered license contains many conditions which have no substantial or reasonable relation to the protection of navigable capacity of any navigable waters of the United States and which, if accepted, would seriously restrict defendant's use of its property, greatly depreciate the value thereof, and involves a consent that the property might be appropriated by the United States for very much less than its value when so appropriated; that said tendered license and each and every such condition thereof is beyond the jurisdiction, power, and authority of the Federal Power Commission or the Federal Government to issue to and/or require the defendant to have or accept as a condition of the exercise of its property right to construct, maintain, or operate the Radford project; that, for a fuller and better statement of the terms and conditions of said tendered license, the defendant prays leave to make profert of a true copy thereof; that, because of the
70 refusal of the defendant to accept said tendered license containing such unauthorized and unconstitutional conditions and requirements as a prerequisite to the exercise of its property right to construct and operate the Radford project, the present suit has been brought on the request of the Federal Power Commission; that, assuming the Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute properly construed does constitutionally authorize the Federal Power Commission or any other Federal agency to require defendant for its Radford project (located on a nonnavigable stream and not involving the use of any land or other

property of the United States) to have or accept a Federal license, permit, or authorization containing such conditions as are reasonably necessary and appropriate to protect the navigable capacity of any navigable waters of the United States, which defendant denies, the refusal of plaintiff's appropriate agency to grant to defendant a Federal license, permit, or authorization, if necessary, for the construction and operation of said project and containing only conditions having a real and substantial relation to the protection of the navigable capacity of any navigable waters of the United States and likewise the refusal of the plaintiff through its appropriate agency to grant defendant any license at all, if necessary, for the construction and operation of said Radford project, unless the defendant would agree to the inclusion of unconstitutional conditions and restrictions, constitute a taking of the defendant's property without due process of law in contravention of the Fifth Amendment to the Constitution of the United States; and that if any relief should be granted plaintiff, which defendant denies, such relief should be limited by and conditioned upon the requirement that plaintiff through its appropriate agency grant, for the construction, maintenance, and operation of the Radford project, a Federal license containing only such conditions as have a real and substantial relation to the protection of the navigable capacity of the navigable waters of the United States.

40. For a further separate and complete defense, defendant repeats and reavers each and every allegation contained in
77 paragraph 31 and avers that, even if New River should be held to be navigable waters of the United States, which defendant denies, and, even if the Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute may properly be construed to authorize and empower the Federal Power Commission or any other Federal agency to issue and require the acceptance of a Federal license, permit, or authorization as a condition of defendant's exercise of its property right to construct, maintain, and/or operate said Radford project, nevertheless any Federal license, permit, or authorization imposed upon or issued to defendant by any appropriate agency of plaintiff must be limited to and contain conditions relating solely to the protection of the interest of the United States in interstate or foreign commerce or, more specifically, to the protection of the navigable capacity of the navigable waters of the United States; that, if the Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute be construed to confer on the said Federal Power Commission or any other Federal agency jurisdiction to issue and to require as a condition of defendant's

exercising its property right, to construct, maintain, and/or operate said Radford project, a Federal authorization, permit, or license (such as the license tendered defendant by the Federal Power Commission on or about July 1, 1927, or the one tendered on or about May 5, 1931) containing conditions other than those relating solely to the protection of the interest of the United States in its navigable waters, then each of said Acts, if so construed, is to that extent unconstitutional and void and in violation of the Fifth and Tenth Amendments to the Constitution of the United States.

41. For a further separate and complete defense, defendant repeats and reavers each and every allegation contained in paragraphs 31, 39, and 40 and avers that, assuming the Federal Water Power Act, the Rivers and Harbors Act of March 3, 1899, or any other Federal statute properly construed does constitutionally authorize the Federal Power Commission or any other Federal agency to require defendant, for its Radford project (located upon a stream assumed, for the statement of this defense
78 and contrary to defendant's contention, to be held to be navigable but not involving the use of any land or other property of the United States), to have or accept a Federal license, permit, or authorization containing such conditions as are cense, permit or authorization containing such conditions as are reasonably necessary and appropriate to protect the navigable capacity of any navigable waters of the United States, then the refusal of plaintiff's agency to grant to defendant a Federal license, permit, or authorization, if necessary, for the construction and operation of said project and containing only conditions having a real and substantial relation to the protection of the navigable capacity of any navigable waters of the United States and likewise the refusal of the plaintiff through its appropriate agency to grant the defendant any license at all, if necessary, unless defendant would agree to the inclusion of unconstitutional conditions and restrictions, constitute a taking of defendant's property without due process of law in contravention of the Fifth Amendment to the Constitution of the United States; and that, if the court, contrary to defendant's contention, should hold New River to be a navigable water of the United States, and, if any relief should be granted plaintiff, which defendant denies, such relief should be limited by and conditioned upon the requirement that plaintiff through its appropriate agency grant, for the construction, maintenance, and/or operation of the Radford project, a Federal license containing only such conditions as have a real and substantial relation to the protection of the navigable capacity of the navigable waters of the United States.

42. For a further separate and complete defense, defendant says, first, that New River is nonnavigable, that the plaintiff is estopped by the finding of its agencies, the Federal Power Commission and its Chiefs of Engineers (U. S. Army), made in relation to this very project, to question the nonnavigability of New River and, secondly, that the allegations of the Bill are insufficient to constitute a valid cause of action upon the ground of an alleged effect of defendant's Radford project upon the distant navigable waters of the Kanawha River, (a) because the allegations in that respect show no act of the defendant in derogation of the authority of the plaintiff under the Constitution of the United States over interstate and foreign commerce or in violation of Section 9 or Section 10 of the Rivers and Harbors Act of March 3, 1899, or the Federal Water Power Act or any other law, (b) because they show no present damage to nor invasion of plaintiff's rights but only an assumed, hypothetical invasion thereof, (c) because they show that the alleged effect of the construction or operation of defendant's project upon interstate or foreign commerce (upon which alleged effect the supposed cause of action set forth in the Bill must wholly rest) is merely a speculative, conjectural and hypothetical effect which can be conceived to be produced only if the defendant were to operate its project at some future time in a fanciful and impracticable manner and because they fail to specify any act or statement of defendant showing any intention so to operate, whereas actually defendant not only has never proposed or threatened or intended to operate its project in such a manner, but has always asserted and still asserts it will not so operate its project, were it physically possible so to do, which defendant denies, (d) because the assumed possibility of producing an effect upon interstate or foreign commerce (upon which effect the supposed cause of action alleged in the Bill completely depends) is predicated solely upon a speculation and conjecture that the defendant physically could operate its project so as to affect interstate or foreign commerce, although it has never done so, has never proposed or threatened so to do and has expressly asserted and still asserts that it intends not to do so and will not do so, wherefore the Bill states no case or controversy but solely a moot case not within the jurisdiction of the Federal Courts, and (e) because, if the operation of the defendant's project could at some future time produce a real, rather than merely a conjectural, effect upon interstate or foreign commerce, nevertheless such effect would

79

be so indirect, collateral, and fortuitous that it would not come within the anticipatory jurisdiction of the Congress.

80 Now, therefore, having fully answered, this defendant prays that it may be hence dismissed, etc.

APPALACHIAN ELECTRIC POWER COMPANY,
By COUNSEL.

(Signed) M. F. MILLIHAN, *New York.*
NEWTON D. BAKER,
RAYMOND T. JACKSON,
Union Trust Building, Cleveland, Ohio.
A. HENRY MOSLE,
CRESWELL M. MICOU,
FRASER M. HORN,
63 Wall Street, New York, N. Y.
JOHN S. DRAPER, *Pulaski, Va.*
JOHN L. ABBOT, *Lynchburg, Va.,*
Solicitors for Defendant.

[*Duly sworn to by Graham Clayton, jurat omitted in printing*]

81 In United States District Court

[Title omitted.]

Order granting leave to amend comr ..nt, etc.

Sept. 19, 1935.

This cause came on this day to be heard upon the motion of the plaintiff to strike the answer filed by the defendant herein, which motion had theretofore been filed in writing and set for hearing on this date;

And thereupon came the plaintiff, by its counsel, namely, Houston Thompson, Allen D. Jones, Oswald Ryan, Willard W. Gatchell, James [illegible] Lawson, and Wayne Williams, and came also the defendant, by its counsel, namely, Newton D. Baker, Raymond T. Jackson, John L. Abbot, Creswell M. Micou, Fraser M. Horn, Wendell W. Forbes, M. F. Millikan, and John S. Draper;

And thereupon came the State of Virginia by A. P. Staples, Attorney General of said State, and asked leave to appear amicus curiae, and came also the State of West Virginia, by Homer A. Holt, Attorney General of said State, and asked leave to appear amicus curiae, it being stated that said states of Virginia and West Virginia had material interest in the outcome of the litigation;

And thereupon, it is ordered that leave be granted to said A. P. Staples, as Attorney General of Virginia, and to Homer A. Holt, as Attorney General of West Virginia, to appear amicus curiae and file their briefs herein.

And thereupon the plaintiff filed in writing its motion to amend its bill of complaint in certain particulars as set out in said motion, and there being no objection thereto, it is ordered that said bill of complaint be amended in accordance with the motion of the plaintiff;

And thereupon the defendant asked leave that it be allowed to file such amendment to its answer as it may be advised to do,
82 in order to respond to said amended bill of complaint, and it is ordered that said leave be granted and the defendant allowed to file such amended answer as it be advised:

And thereupon argument was had before the Court by counsel for both the plaintiff and the defendant on the motion of the plaintiff to strike the answer of the defendant.

Enter:

(Signed) JOHN PAUL, *Judge.*

Received and entered September 27, 1935.

C. E. GENTRY,
Clerk.

By (Signed) LOUIS H. PRICE,
Deputy.

83 In United States District Court

[Title omitted.]

Petition of the Commonwealth of Virginia for leave to appear as amicus curiae

Filed Aug. 3, 1935

To the Honorable JOHN PAUL, JUDGE OF THE DISTRICT COURT FOR THE WESTERN DISTRICT OF VIRGINIA:

Now comes the Commonwealth of Virginia, by Abram P.
84 Staples, its Attorney General, and respectfully moves the court that it be granted leave to appear as amicus curiae in this case and orally and by brief to argue the same, or such questions arising therein as may affect its interests. In support of this motion the following grounds and reasons are assigned:

1. The purpose of this suit instituted May 9, 1935, by the United States of America, is to restrain and enjoin the defendant, Appalachian Electric Power Company, from the construction, opera-

tion, and maintenance of a certain dam in and across New River, in Pulaski County, Virginia. Said defendant is a Virginia corporation empowered by its charter to construct and operate said dam which is intended for the purpose of generating hydroelectric power for sale and distribution in the public service.

2. The Commonwealth of Virginia, by Acts of its General Assembly, has asserted its right, power, and purpose, to control and regulate the construction and operation of dams for the generation of hydroelectric power in and across all the rivers and streams in said Commonwealth, including streams navigable both in interstate commerce and in commerce wholly within the State. The State Corporation Commission of Virginia is the agency through which the said Commonwealth exercises such control and regulation. The jurisdiction of said Commission with respect to such projects and the extent of the powers of control and regulation which it exercises over them are in brief as follows:

(a) No dam may be constructed in any of the rivers of
85 Virginia for the purpose of generating hydroelectric energy without a license from the State Corporation Commission, obtained upon application and in the manner provided in the statute.

(b) A hearing shall be had upon the application for the license, and the Commission may grant or refuse same as applied for, or may modify the plans of development in such respect as to provide for the greatest utilization of the power of the stream, or as may otherwise be in the public interest.

(c) No license may be assigned without the Commission's approval.

(d) The Commission may sue to compel compliance with the terms of the license or for revocation thereof, if such terms are violated.

(e) The Commission may promulgate rules and regulations in the administration of the Act and require reports concerning the operation.

3. By the terms of said statute the Commonwealth of Virginia reserves the right at any time to take over by condemnation any development so licensed, and, after the expiration of the term of the license (fifty years), the Commonwealth may recapture same by purchase.

4. All of the statutory provisions hereinabove referred to are contained in Chapter 424 of the Acts of the General Assembly of 1928 (pp. 1099–1108), as amended by Chapter 346 of the Acts of the General Assembly of 1932 (pp. 683–686).

5. In addition to the powers asserted and exercised by the Commonwealth of Virginia over hydroelectric dams and developments, as provided in the statutes referred to in the preceding para-

86 graph, it has conferred by statute upon the State Corporation Commission, as its regulatory agency, the same general rate fixing and regulatory powers over electric power companies as are possessed by the Commission over other public service corporations.

6. On June 22, 1932, the said defendant, Appalachian Electric Power Company, recognizing the jurisdiction and power of the Commonwealth of Virginia to control the development of the hydroelectric power of its streams, applied to the State Corporation Commission of Virginia for and was granted by it a license pursuant to the statutes referred to in the fourth paragraph hereof, for the construction and operation of a dam in and across New River, in Pulaski County, Virginia, near the city of Radford, which is the dam complained of by the United States in this suit. The purpose for which said dam was licensed was the generation of hydroelectric power for sale and distribution in the public service.

7. Pursuant to and in accordance with said license so granted to it by the Commonwealth of Virginia, the defendant, Appalachian Electric Power Company, on or about the first of June 1934, began the construction of said dam, and has since continued and is now engaged in the work of building same.

8. For many reasons the Commonwealth of Virginia is deeply interested in the construction and operation of this and other similar developments on its streams. These plants provide work

87 for the people of the State, and, by reason of the more abundant and cheaper electric power flowing therefrom, industries of many kinds are encouraged to and probably will enter the State, resulting in increased employment and taxable values, and in the enhancement of the general prosperity and welfare of its citizens.

9. The grounds upon which the United States prays for an injunction to prohibit the construction and operation of this development are briefly:

(a) That the Federal Water Power Act, referred to in the Bill of Complaint, confers upon the Federal Water Power Commission exclusive jurisdiction to determine when and where and what kind of dams shall be built upon the entire New River; and how same shall be operated.

(b) That Congress in enacting said statute was empowered so to do by the Commerce Clause of the Constitution of the United States. The Bill seeks to bring the case within this clause of the Constitution by alleging, first, that New River is a navigable stream and this fact alone confers upon Congress the power to legislate as it pleases with respect to same; and, second, that if the stream be held to be not navigable at the place of the dam,

nevertheless, the operation of the dam in the manner contemplated by the defendant power company will so substantially affect navigation on the Kanawha River (into which New River empties) at the point where actual navigation begins, which is 155 miles downstream from the site of the defendant's dam, as to constitute an interference with interstate commerce.

(c) That the Congress having asserted jurisdiction and entered this field, its authority is exclusive and the Commonwealth
88 of Virginia is without power, authority, or jurisdiction to authorize the construction of the dam or to regulate its operation.

10. The answer of the defendant, Appalachian Power Company, denies that the New River, at the site of the dam or elsewhere, is navigable in interstate commerce, or that it is a navigable stream; and denies that its dam, now in course of construction, will in any way affect or interfere with navigation in interstate commerce on the New River, the Kanawha River, or any other stream, and denies that either the construction or operation of its dam will in any way affect interstate commerce.

11. The Commonwealth of Virginia takes the position that it was and is acting within the reserved powers of the State in exercising its control and regulation of the development here in question, and that same does not have a sufficiently substantial relation to interstate commerce so as to bring it within the jurisdiction of Congress for any purpose; that even if a substantial relation to interstate commerce were shown to exist, the powers which the Federal Power Commission is undertaking to exercise over said development are in excess of those necessary to protect such interstate commerce, and constitute an unlawful interference with and infringement upon the reserved powers of Virginia as provided for in the Federal Constitution.

12. The Commonwealth of Virginia, through the statutory enactments of its General Assembly, asserts the right to condemn the development here involved, at any time, and to recapture
89 same by purchase after the expiration of fifty years. The Federal Water Power Act constitutes an assertion by the Congress of the right of the United States to recapture same after the lapse of a similar time.

13. The assertions of jurisdiction, authority, and power over the development in question being made by the Commonwealth of Virginia, and which it is now actually exercising, are in clear and direct conflict with the claims of jurisdiction, authority, and power over same which the United States is seeking to establish in this suit.

14. It is apparent, therefore, that the effect of granting an injunction in accordance with the prayer of the Bill of Complaint,

will be, not only to deny to the Commonwealth of Virginia the jurisdiction, authority, and power which its General Assembly has asserted, but also to interfere with the control now being exercised by the State Corporation Commission of Virginia to the end that the dam and development in question be constructed at such place, of such a type, and in such a manner as to utilize to the greatest possible extent the water power now latent in the stream.

15. For the reasons hereinabove stated, therefore, the said Abram P. Staples, Attorney General of Virginia, respectfully submits that the Commonwealth of Virginia is vitally interested in the decision of the questions, both of law and fact, which are involved in this suit, and in the decrees which may be entered herein respecting the exercise of the governmental powers which it is now asserting and exercising, and that it
90 should be permitted to be heard, both in oral argument and by written brief, when said questions come to be considered by the court.

Copies of this motion have been served upon counsel for both plaintiff and defendant, and notice of some appropriate and agreeable time for the hearing of same, should there be objection thereto, will be given.

ABRAM P. STAPLES,
Attorney General.

92 In United States District Court

[Title omitted.]

Petition of the State of West Virginia for leave to appear as amicus curiae

Filed Sept. 19, 1935

To the Honorable JOHN PAUL, JUDGE OF THE DISTRICT COURT OF THE UNITED STATES FOR THE WESTERN DISTRICT OF VIRGINIA:

Comes now the State of West Virginia, by Homer A. Holt, its Attorney General, and respectfully makes unto Your Honor the following representations.

93 (1) The above-styled suit was instituted in the District Court of the United States for the Western District of Virginia by the United States of America against the Appalachian Electric Power Company, a Virginia corporation, for the purpose of enjoining said corporation against the construction or opera-

tion of a certain hydroelectric project now under construction by the said defendant in and on the waters of New River, near Radford, Virginia, unless a license therefor be obtained from the Federal Power Commission; or, in the alternative, for the purpose of requiring the defendant to remove any part of said project which is within the limits of New River.

(2) New River, on the upper part of which the said project is being constructed, after flowing through the State of Virginia, enters the State of West Virginia and flows therethrough for a distance of approximately ninety miles to the mouth of Gauley River, where the confluence of said Gauley River and New River form the Great Kanawha River, which said Great Kanawha River is navigable waters of the United States from a point approximately seven miles below said confluence to the mouth thereof on the Ohio River.

(3) The theory of the bill of complaint of The United States is that The United States has constitutional authority to fully prohibit or control the said project and that the Federal Water Power Act is a constitutional congressional enactment which inhibits the construction and operation of said project unless such construction and operation be licensed by the Federal Power Commission; and upon the further theory that said project is being constructed in violation of Sections 9 and 10 of the Rivers and Harbors Act of 1899.

94 (4) Due to the geographical situation of the State of West Virginia there is included within its boundaries a large area in the higher altitudes of the Allegheny Mountains which is the source of numerous nonnavigable streams flowing into the Kanawha, Ohio, Monongahela, and Potomac Rivers. Because of the precipitous nature of the country which said nonnavigable rivers traverse, many of such streams have a rapid fall capable of producing large water power—at this time largely undeveloped—but of great value to the State and to its citizens.

(5) Since 1913 it has been the policy of the State of West Virginia, declared by its legislature, that the State of West Virginia control and supervise the development of water power from the streams within its boundaries.

(6) The bill of complaint herein contains allegations that New River throughout its course, and particularly so far as this petitioner is concerned, that part flowing through West Virginia, is navigable waters of the United States, and refers to certain official actions of the State of West Virginia as recognizing such alleged navigability.

(7) Petitioner does not believe that New River, or any part thereof, particularly that part in West Virginia, is navigable waters of the United States, and certain official investigations of

legally constituted agencies of the State of West Virginia have so found with respect to extended sections thereof.

95 (8) The bill also contains allegations that the construction and operation of said project will affect the navigability of the Great Kanawha River.

(9) Petitioner, on information, does not believe that the construction and operation of said project can possibly materially affect the navigability of the Great Kanawha River, and believes that the proposed and intended operation of said project will not affect the navigability of the Great Kanawha River.

(10) The defendant has filed its answer to the plaintiff's bill denying that the New River is navigable waters of the United States and denying that the construction and operation of said project either can or will affect the navigability of the Great Kanawha River; and the plaintiff has filed its motion to strike the said answer of the defendant, together with a brief purporting to support said motion. Said motion is predicated upon the theory that the Court will take judicial notice that New River throughout its course is navigable waters of the United States and judicial notice that the construction and operation of said project will affect the interests of interstate commerce in that it will affect the actual navigability of the Great Kanawha River.

(11) The State of West Virginia, believing as aforesaid that New River is not navigable waters of the United States, is interested that New River be not adjudicated to be navigable waters of the United States, and, particularly, is interested that such alleged navigability, contrary to the interests of the State

96 of West Virginia, and which petitioner believes not to be a fact, be not determined by judicial notice, and is interested that it be not judicially noticed that a proper construction and operation of hydroelectric projects upon New River and other nonnavigable streams in West Virginia tributary to navigable waters of the United States, will so affect the navigability of the Great Kanawha River and other navigable waters of the United States, which petitioner believes is not the fact, as to prevent the construction and operation of projects in the State of West Virginia such as that here under consideration, in the State of Virginia, unless subject to all the laws, rules, and regulations of the Federal Power Commission.

(12) Petitioner believes that the Federal Water Power Act in its entirety, and if not in its entirety, so far as it is sought to be applied to nonnavigable waters, is an unconstitutional attempt to usurp for the Federal Government powers not vested in the United States by the Constitution thereof, but reserved to the states or to the people by the Tenth Amendment to the Federal Constitution.

(13) There are presented in this case many questions involving the interpretation and constitutionality of federal statutes which are of great and direct importance to the judicial determination of the respective sovereign rights, powers, and duties of the Federal Government and of the States, and your petitioner is vitally interested therein, not only by reason of its interest in New River, but also because of its interest in other streams within its borders, for the control of which, for the purpose of the development
97 of water power, precedents may be established in this case.

Wherefore, your petitioner, the State of West Virginia, prays that it be granted leave and permitted to appear in this case as amicus curiae and to be heard by written brief and oral argument in the consideration by Your Honor of the questions in this case which will involve the interests of the State of West Virginia either directly or indirectly.

(Signed) HOMER A. HOLT,
Attorney General of the State of West Virginia.

98 In United States District Court

[Title omitted.]

Motion for leave to take deposition

Filed Aug. 26, 1936

Comes now the defendant, pursuant to equity Rule 47, and showeth as follows:

1. That on June 13, 1936, Newton D. Baker, of counsel for the defendant, wrote a letter to the Secretary of War in the words and figures following, to wit:

Honorable GEORGE H. DERN,
The Secretary of War, War Department, Washington, D. C.

MY DEAR MR. SECRETARY: The case of United States v. Appalachian Electric Power Company is set for hearing beginning on July 13, 1936, before the Honorable John Paul, District Judge at Roanoke, Virginia, in the Western District of Virginia. The case involves engineering questions upon which the defendant believes that the following officers, as witnesses, would be helpful to the Court: Lt. Col. John F. Conklin, present United States District Engineer for the Huntington District (Ohio River Division); Lt. Col. Fred W. Herman, immediate predecessor of Col. Conklin; and Lt. Col. E. D. Ardery, predecessor of Col. Herman.

None of these officers is within the judicial district or within one hundred miles of the place of trial and they are not, there-

fore, subject to subpoena. Their depositions could, of course, be taken, but in the belief that their personal attendance would make them more helpful to the Court, the defendant respectfully requests that the War Department by suitable orders authorize their personal appearance, all at the cost and expense of the defendant as to travel and maintenance. The defendant will endeavor to minimize the inconvenience and shorten the absences of these officers from their stations by arranging for their attendance only while actually giving their testimony

The defendant believes that favorable action upon this request will further the administration of justice in a matter important alike to it and to the United States.

With great respect,
Sincerely yours,

NEWTON D. BAKER.

99 2. That in response to the aforesaid letter, S. D. Embick, Acting Secretary of War, replied to the above letter on June 22, 1936, in the words and figures following, to wit:

Honorable NEWTON D. BAKER,
Union Trust Building, Cleveland, Ohio.

MY DEAR MR. BAKER: Receipt is acknowledged of your letter of June 13, 1936, requesting the War Department to authorize the personal appearance of three Army officers, whom you have designated, to testify on behalf of the defendant in the case of the United States v. the Appalachian Electric Power Company at the hearing beginning on July 13, 1936, before the honorable John Paul, District Judge at Roanoke, Virginia, in the Western District of Virginia, provided the expense of attendance of the officers be borne by the defendant.

It is the policy of the War Department not to authorize officers to testify as to matters, knowledge of which they have gained through official channels, except upon a certificate of a court having jurisdiction over a particular case that their evidence is necessary in the interests of justice in the pending case. Upon receipt of such a certificate, which should include a statement of the information expected from the officers, the Secretary of War will authorize the officers to testify unless in his judgment it would be contrary to the public interest to disclose such information. This policy is equally applicable whether the officers appear personally in the court to testify or whether their testimony is to be given by deposition, and conformably thereto the certificate of the court should be furnished to the Secretary of War for his determination as to whether the officers will be authorized to testify.

If upon receipt of the above referred to certificate it appears the officers named should be permitted to testify to matters of their personal knowledge, they, if their services can be spared, will be authorized to appear in person at the hearing beginning July 13, 1936, before Honorable John Paul, District Judge, Roanoke, Virginia, provided no expense to the Government is incurred and the defendant shall arrange with the officers for the payment of their travel expense from their stations to the Court and return and for their maintenance.

The foregoing is predicated upon the assumption that the testimony of the officers named in your letter is desired as to matters within their personal knowledge. If, however, it is contemplated using these officers as expert witnesses you will appreciate that the War Department would not be justified in furnishing such witnesses to testify against the Government.

Sincerely yours,

S. D. EMBICK,
Acting Secretary of War.

3. That upon the application of the defendant, by counsel, the Judge of this Court addressed the Secretary of War on June 26, 1936, a letter which was as follows, to wit:

100 Honorable GEORGE H. DERN,
Secretary of War, Washington, D. C.

MY DEAR MR. SECRETARY: There is pending before this Court the case of the United States vs. Appalachian Electric Power Company, which is set for hearing before me beginning on Monday, July 13, 1936, at Roanoke, Virginia. The defendant desires that there be present for examination as witnesses at an appropriate stage of the trial certain officers of the United States Army, hereafter named. None of these officers are within the judicial district or within 100 miles of the place of trial and they are, therefore, not subject to the process of this court. The officers in question are:

Lieutenant Colonel John F. Conklin, present United States District Engineer for the Huntington District (Ohio River Division);

Lieutenant Colonel Fred W. Herman, immediate predecessor of Colonel Conklin; and

Lieutenant Colonel E. D. Ardery, predecessor of Colonel Herman.

One of the material issues in the pending suit is whether or not the New River is a navigable water of the United States. Another material question involves the effect on the navigation or navigable capacity of the Kanawha River, of which the New River is a tributary, of the proposed erection by the de-

fendant of a dam across the New River near Radford, Virginia. I have been advised and am of opinion that, due to their connection with and their knowledge of the New and Kanawha Rivers, the officers above named are in a peculiarly advantageous position to give material testimony touching the questions involved. The New and Kanawha Rivers are both within the Huntington District and so, of course, are the navigation dams recently construed or in course of construction upon the Kanawha River. The testimony expected to be given by these officers would be that arising from their peculiar knowledge of the issues involved in this case and would comprise all material testimony which they are competent to give upon these issues.

I, therefore, certify that the material testimony which the above-named officers appear to be competent to give on the said issues is necessary in the interests of justice in the pending case, and request that they be made available provided suitable arrangements shall be made with the above-named officers by the defendant for the payment of their travel expense from their stations to the Court and return, and for their maintenance while en route and in attendance.

The precise time of attendance can be arranged subsequently, but is now expected to be around August 1st, or shortly thereafter. In that respect, I shall see that everything will be made to suit the convenience of the War Department or the Chief of Engineers and the officers themselves.

I have a copy of a letter of June 22, 1936, from S. D. Embick, Acting Secretary of War, to the Honorable Newton D. Baker, of counsel for the defendant. In respect of that letter, it seems to me that any limitation upon the scope of the testimony of such officers, so long as material to the case and competent, would not be compatable with the interests of justice.

Very respectfully,

(Signed) JOHN PAUL,
District Judge.

101 4. That in response to the letter last hereinbefore set forth the Judge of this Court received the letter, which in words and figures was as follows, to wit:

JULY 17, 1936.

Honorable JOHN PAUL,
District Judge, United States District Court,
Western District of Virginia, Roanoke, Virginia.

DEAR JUDGE PAUL: Careful consideration has been given to your letter of June 26, 1936, requesting that Lieutenant Colonel John F. Conklin, Lieutenant Colonel Frederick W. Herman, and Colonel Edward D. Ardery, all of the Corps of Engineers, be made avail-

able by the War Department to appear as witnesses at the trial of the case of the United States against the Appalachian Electric Power Company and to testify on behalf of the defendant about the first of August.

You have stated:

"One of the material issues in the pending suit is whether or not the New River is a navigable water of the United States. Another material question involves the effect on the navigation or navigable capacity of the Kanawha River, of which the New River is a tributary, of the proposed erection by the defendant of a dam across the New River near Radford, Virginia. I have been advised and am of the opinion that, due to their connection and their knowledge of the New and Kanawha Rivers, the officers above named are in a peculiarly advantageous position to give material testimony touching the questions involved."

It is the understanding of the War Department that the determination of whether a body of water is navigable must be arrived at under the rule stated in United States v. Holt State Bank (270 U. S. 49, thus, p. 56):

"The rule long since approved by this Court in applying the Constitution and laws of the United States is that streams or lakes which are navigable in fact must be regarded as navigable in law; that they are navigable in fact when they are used, or are susceptible of being used, in their natural and ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade or travel on water; and further that navigability does not depend upon the particular mode in which such use is or may be had—whether by steamboats, sailing vessels, or flatboats—nor an absence of occasional difficulties in navigation, but on the fact, if it be a fact, that the stream in its natural and ordinary condition affords a channel for useful commerce." The Montello, 20 Wall. 430, 439; United States v. Cress, 243 U. S. 316, 323; Economy Light and Power Co. v. United States, 256 U. S. 113, 121; Oklahoma v. Texas, 258 U. S. 574, 586; Brewer-Elliott Oil and Gas Co. v. United States, supra, p. 86.

If the testimony of the officers is desired for the purpose of establishing the fact that the waters in question are or have been used as highways of trade and travel in the customary modes of trade and travel on water, it would seem that there should be many witnesses available to establish this fact.

It appears from your letter, however, that the testimony of these officers is desired not for the purpose of establishing
102 the past or present use of these waters for the purpose of navigation but for the purpose of giving their opinion as experts as to the navigability of New River and the effect of the proposed dam across New River on the navigable capacity of the Kanawha River.

The War Department is fully aware of its obligation to make available Army officers to testify as to any facts within their personal knowledge which are material to the issues involved in litigation, even where the United States is a party to the litigation and where the testimony of such officers would be against the United States, provided the testimony of such officers does not involve the revelation of confidential matters or military secrets which public policy dictates should not be disclosed. However, the War Department feels it would not be justified in making the above-named officers available to appear at Roanoke for the purpose of giving their opinions as expert witnesses for the defendant in a case in which the United States is the plaintiff.

It is regretted that the War Department is unable to accede to your request.

Sincerely yours,

(Signed) HARRY H. WOODRING,
Acting Secretary of War.

5. That the defendant is advised and therefore believes that if the above-mentioned Lieutenant Colonel John F. Conklin, present United States District Engineer, War Department, Huntington District (Ohio River Division), were made available and allowed to testify he would give valuable testimony as to matters concerning the existing dams on the Kanawha, the new dams under construction, and the operation of both the old and the new dams.

6. That defendant is advised and therefore believes that
103 if the aforesaid Lieutenant Colonel Fred W. Herman, who was U. S. District Engineer, War Department, immediately preceding Colonel Conklin, were made available, and were permitted to testify in this case, he would testify that in his opinion New River is not susceptible of practical use by boats capable of carrying any substantial trade or commerce; that in his opinion it is not susceptible of practical use by boats; that in his opinion New River was not in its natural condition and is not now susceptible of navigation; that to the best of his knowledge the series of artificial "waves" released in March 1930 by repeatedly discharging and refilling the entire available pondage at Byllesby and Buck hydro stations on New River did not cause interference with navigation on nor the navigable capacity of the Kanawha River nor did the fluctuation in flow due to those hydro stations cause any such interference during the low-water period beginning September 1930 (when his term of office as U. S. Engineer, Huntington District, began) or at any time afterward during his term as District Engineer ending in 1934; that with the existing and proposed "high" roller gate dams there will be less possibility of interference with navigation on or the navigable capacity of the Kanawha

River than with the old wicket type dams; that the 1930 artificial "wave" tests show that a substantial degree of variable or peak carrying operation of power stations is feasible without interfering with navigation on or the navigable capacity of the Kanawha River; that it would be possible to operate the Radford project variably but nevertheless so that no interference with navigation on or the navigable capacity of the Kanawha River would result with either the old or the new dams.

7. That the defendant is advised and, therefore, believes that if the aforesaid Lieutenant Colonel E. D. Ardery, who was U. S. District Engineer, War Department, immediately preceding Colonel Herman, were made available and permitted to testify, he would testify that in his opinion New River is not susceptible of practical use by boats capable of carrying any substantial trade or commerce; that in his opinion it is not susceptible of practical use by boats; that in his opinion New River was not in its natural condition and is not now susceptible of navigation; that power waves from the Buck and Byllesby dams during the period of 1927–1930, did not cause any interference with navigation on or the navigable capacity of the Kanawha River; that during the power-wave tests conducted in March 1930 from the Buck and Byllesby plants there was no interference with navigation on or the navigable capacity of the Kanawha River nor with the operation with navigation works; that there are numerous fluctuations due to natural conditions (rains) which in the case of the old wicket type dams, would require lowering of wickets in absence of any power waves; that there would be less possibility of interference in the future with existing and proposed high roller-gate dams than there were when the old wicket dams were in operation; that after the new Winfield and Gallipolis roller-gate dams are in operation, substantially larger waves than the test waves of 1930 could occur without adversely affecting navigation or the navigable capacity of the Kanawha River; that a substantial degree of variability or peak carrying operation of power stations is feasible without interference with the navigable capacity of the Kanawha River; that it would be possible to operate the Radford project variably but nevertheless so that no interference with navigation on or the navigable capacity of the Kanawha River would result with either the old or new dams; specifically that it is feasible for the Appalachian Electric Power Company to carry out its declared intention.

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8. That the trial of this case was begun on the 13th day of July 1936, and has continued down to the present time, plaintiff having rested its case on the 13th day of August, and the defendant being now engaged in the presentation of its case with the prospect of completing it in the very near future.

9. That whereas it had been hoped that Secretary of War would not persevere in his oppressive and inequitable ruling but instead would make available the above-mentioned officers, who, on account of their more intimate contact with the situation were, and are, in a position to know more about certain of the facts and matters involved in this case than any other persons, nevertheless said officers have not been made available, and no assurance or even intimation has been given either by the Secretary of War or counsel for the Government that they would be made available despite the representations made by the defendant and the Judge of this Court with respect to them; that although, in view of the ruling of the Secretary of War, it is not desired to embarrass the officers in question by asking their opinions and expending the time of this court and causing delay in this trial by necessary habeas corpus proceedings for the purpose of requiring the full and unrestrained testimony of the aforesaid officers, and while certain matters of fact within the knowledge of certain the aforesaid officers appear otherwise in this proceeding, nevertheless there are certain matters of fact which the defendant is advised and believes Colonel Ardery will testify to which may be necessary to its case, which matters of fact are:

105

(a) The power waves from Byllesby and Buck in 1927–30 did not cause any interference with navigation on or the navigable capacity of the Kanawha River.

(b) During the power wave test of March 1930 there was no interference with navigation on or the navigable capacity of the Kanawha River, and there was no interference with the operation of the navigation works.

In consideration whereof, for the good and exceptional cause hereinabove set forth, defendant prays that it may be allowed to take the deposition of the aforesaid Lieutenant Colonel E. D. Ardery, at present, Engineer, Fifth Corps Area, Fort Hayes, Columbus, Ohio, touching the matters of fact last above mentioned in the city of Columbus, Ohio, on the day of August 1936, before a Notary Public or other authorized officer, at such place to be designated by the defendant, notice of which place and the hour of taking such deposition to be given counsel for the plaintiff on or before 10 o'clock A. M. on August 27, 1936, in order that said deposition may be taken and expeditiously returned and filed in this court and may be read by the defendant as a part of its evidence in this case, and the defendant moves accordingly.

APPALACHIAN ELECTRIC POWER COMPANY,
By (Sgd.) JOHN L. ABBOT, *of Counsel.*

[*Duly sworn to by John L. Abbot; jurat omitted in printing.*]

106 In United States District Court

[Title omitted.]

Order

Entered Aug. 26, 1936

The defendant, pursuant to Federal Equity Rule 47, having filed its verified motion for the purpose of taking the deposition of Lieutenant Colonel E. D. Ardery, Engineer, Fifth Corps Area United States Army, Fort Hayes, Columbus, Ohio, and good and exceptional cause having been shown by the defendant for the taking of said deposition at the time and place hereafter set forth.

It is ordered that the defendant be and it hereby is authorized and permitted to take the deposition of said Lieutenant Colonel E. D. Ardery before Kenneth L. Sater, a Notary Public, in and for Franklin County, Ohio, at the office of Sater & Sater, 50 East Broad Street, Columbus, Ohio, on August 28th, 1936, beginning at 11 o'clock in the forenoon of said day with respect to the following matters:

(a) Whether or not power waves from the Byllesby and Buck Hydro Stations during the years 1927–30 caused any interference with navigation on or the navigable capacity of the Kanawha River.

(b) Whether or not during the power wave test conducted during March 1930 there was interference with navigation on or the navigable capacity of the Kanawha River and whether or not there was interference with the operation of the navigation works, and

It is further ordered that the defendant be permitted to apply to the United States District Court for the Southern District of Ohio, Eastern Division or to such proper officer as the defendant may be advised for a subpoena to compel the attendance of said Lieutenant Colonel E. D. Ardery at the time and place aforesaid.

(Signed) JOHN PAUL,
District Judge.

Dated Aug. 26, 1936.

106a In United States District Court

[Title omitted.]
[File endorsement omitted.]

Stipulation relating to plaintiff's request for findings of fact and conclusions of law

Filed Dec. 2, 1938

It is stipulated by the parties hereto that the attached restatement of plaintiff's request for findings of fact and conclusions of law now may be filed in the District Court and may be included in the transcript of record on appeal in this cause in lieu of plaintiff's original request for findings of fact and conclusions of law and plaintiff's supplemental request for findings of fact and conclusions of law filed in the District Court on the 4th day of March 1937, and the 10th day of August 1937, respectively.

This 17th day of November 1938.

JOHN W. AIKEN,
John W. Aiken,
Special Assistant to the Attorney General,
WILLARD W. GATCHELL,
Willard W. Gatchell,
Principal Attorney, Federal Power Commission,
Solicitors for Appellant.
WENDELL W. FORBES,
Solicitor for Appellee.

107 In United States District Court

[Title omitted.]

Plaintiff's suggested findings of fact and conclusions of law and plaintiff's supplemental requested findings of fact and conclusions of law as renumbered and rearranged for purposes of appeal.

The plaintiff, United States of America, requests the Court to make the following findings of fact and conclusions of law in this case:

FINDINGS OF FACT

I. History of the Controversy

1. A brief recital of the proceedings before the Federal Power Commission shows that the defendant's predecessor in interest, the New River Development Company (wholly owned subsidiary

of the Appalachian Electric Power Company), filed a declaration of intention under the provisions of Section 23 of the Power Act, which declaration could only have been filed for the purpose of securing a determination by the Commission in accordance with the terms of that section.

2. The defendant's predecessor filed a declaration of intention under the provisions of Section 23 of the Federal Water Power Act of June 10, 1920, which declaration was assigned to and accepted by the defendant. Subsequent to such declaration, the defendant filed an application for license, which at its request was considered by the Federal Power Commission in connection with the declaration of intention previously filed. Pur-
108 suant to such declaration and under the terms of Section 23, the Federal Power Commission made the investigation called for and found that such proposed construction would affect the interests of interstate commerce. No license for such construction has been accepted by defendant under the terms of that Act.

3. After public hearings held March 2, 1926, the declaration of intention, with the consent of the Commission, was assigned and transferred to the defendant, which at the same time, September 4, 1926, filed an application for license for the proposed development. Pursuant to the terms of the Act, the Commission proceeded with the investigation called for by Section 23 and on June 1, 1927, found that the New River "in the part thereof involved in said declaration of intention is not 'navigable waters' within the definition thereof in said Act," but that "the interests of interstate or foreign commerce would be affected by such proposed construction." This finding was made after the Commission had afforded to the defendant every opportunity to argue and present any evidence it desired at an open hearing in opposition to a recommendation by the Executive Secretary that the Commission find that the proposed project would affect the interests of interstate or foreign commerce. Should the Commission find that a proposed project, made the subject of a declaration of intention, under Section 23, would not affect the interests of interstate and foreign commerce and such project when constructed actually affected lower navigable reaches of the stream involved, the owner of such project would not be required to secure a license or other authorization for said project, because Section 23 itself carries the consent of Congress under such circumstances. An examination of Section 23, therefore, leaves no doubt that it was the intent of Congress to afford stream developers uncertain as to the extent of Federal jurisdiction, a means of securing an authoritative finding from the Commission prior to the expenditure of funds in actual construction.

In this conception of Section 23 a declarant is not entitled, as a matter of right, to a public hearing before the Commission
109 makes the finding required by that Section.

4. At the time the Commission made its finding of June 1, 1927, it had before it reports from the Chief of Engineers and his subordinates upon both the declaration of intention and the application for license; affidavits submitted by the defendant; transcripts of hearings before it and before the United States District Engineer at Radford, the latter hearing being upon the application for license, which, at the request of the defendant, was considered at the same time as the declaration of intention. In addition, the Commission had before it certain wave studies which had been made at its direction upon the Pit and Sacramento Rivers in California and other proceedings before it involving proposed use of the upper New River. The record before the Commission shows that the defendant had the fullest opportunity to present factual evidence and legal argument before the Commission acted but failed to present any evidence whatever as to the effect of the operation of the proposed project, contenting itself with numerous briefs.

5. The Commission about July 1, 1927, forwarded to the defendant copies of the license which it proposed to issue for the development, which license the defendant refused to accept. On April 26, 1928, the defendant again notified the Commission of its unwillingness to accept the tendered license and requested the Commission to obtain from the Attorney General of the United States an opinion upon certain legal questions respecting the powers, authority, and jurisdiction of the Federal Power Commission. At its meeting held on May 28, 1928, the Commission: (a) declined to refer to the Attorney General the questions set forth in defendant's letter of April 26, 1928; and (b) declined to modify the form of license as requested in defendant's letter of March 1, 1928.

6. The defendant again on February 4, 1940, requested the Commission to reconsider its finding of June 1, 1927, and on October 6, 1930, applied to the Commission for a so-called
110 "minor part" license under the provisions of Section 10 (i) of the Power Act. On December 22, 1930, the Commission was reorganized and thereafter on February 16 and 17, 1931, held a hearing relative to the extent of its jurisdiction over defendant's project and on the defendant's request of February 4, 1930. After consideration, the Commission declined to reverse the finding of the former Commission as to the effect of the proposed project upon the interests of interstate or foreign commerce and refused to issue a so-called "minor part" license to the defendant and ordered the defendant not to proceed with construction until it

had received and accepted a standard form license. This order was superfluous, as the provisions of Section 23 carried the same restraint after the finding of the Commission.

7. The Chief of Engineers and the Secretary of War approved the revised plans for the proposed project about December 7, 1930, without, however, advising the Commission the form of license which the Commission could or should issue. The conditions recommended by the Chief of Engineers for incorporation in the license related only to navigation, and did not touch those other matters to which the defendant has objected, namely, recapture, accounting, and conditions relating to power development.

II. Navigability of New River

8. New River is unusual in that its direction of flow is from south to north. Thus the direction of early migration from the Eastern Seaboard was squarely across the river instead of being parallel to it. This fact to a large extent explains the absence of general use of the river in connection with the early settlement of that section of the country. The products of the lead mines and iron furnaces located on the upper New, in passing to the eastern markets, would find little advantage in moving in a northerly direction down the river. With respect to the market at St. Louis or Cincinnati, utilization of the river for purposes of transportation would necessitate navigation of the "gorge," located
111 far down the river between Bowyer's Ferry and the mouth of the Gauley, wherein navigation, although possible—it had been navigated downstream by both the John Marshall Commission, and the Moore & Briggs Expedition—was too difficult and hazardous to encourage regular commerce, especially in heavy cargoes such as lead and iron. Furthermore, in so far as the reach from Allisonia to Hinton is concerned, there was little occasion for the use of New River as a means of transportation prior to the Civil War. The countryside was sparsely settled, and there was no railway connection until the Atlantic, Mississippi & Ohio Railroad crossed the river at Radford in 1856, and the Chesapeake & Ohio at Hinton in 1872.

9. The length of New River from the mouth of Wilson Creek (mile 252) to the junction of the New and the Gauley is 252 miles. The average fall throughout is 7.1 feet per mile. The width of the river increases from 300 feet at the mouth of Wilson Creek to approximately 900 feet at Hinton (mile 62.5). Below Hinton the width decreases considerably. At summer or low stages, the discharge is approximately as follows: at Wilson Creek (mile 252), 1,000 c. f. s.; Lead Mines (mile 190), 1,200 c. f. s.; Radford Dam Site (mile 151), 1,500 c. f. s.; Hinton (mile 62.5),

1,700 c. f. s.; at mouth of the New, 2,000 c. f. s. The average discharge at the five points named is as follows: Wilson Creek, 1,800 c. f. s.; Lead Mines, 2,500 c. f. s.; Radford Dam Site, 3,211 c. f. s.; Hinton, 6,400 c. f. s.; and mouth of the New, 10,000 c. f. s. Considering the river in its natural state, with conditions of flow approaching extreme low, the average depth over the controlling bars or shoals is from nine to twelve inches in the upper reaches—Wilson Creek to Lead Mines; twelve inches in the middle reaches—Lead Mines to Hinton; while in the lower reaches—below Hinton—the depths are considerably increased. During periods of low flow the depths in the pool sections of the river are from five feet to six feet. During periods of mean flow, all depths are increased by a minimum of one foot above those obtaining at low flow. The velocity of the current in the upper reaches is one mile per hour in the pools, three miles per hour over the shoals, and five miles per hour over the rapids. In the reach between
112 Radford and Hinton, the velocity in the pools is one mile per hour, while over the shoals and rapids it varies from a minimum of 1.9 miles per hour to a maximum of 4.4 miles per hour.

10. From the mouth of Wilson Creek (mile 252) to the Lead Mines (mile 190), a distance of 62 miles, the width of the river increases from 350 feet to 450 feet. The fall throughout this reach is approximately eight feet per mile, while natural depths of from nine to twelve inches, over the controlling bars, are found with conditions of flow approaching extreme low. Such depths are increased during stages of mean flow by a minimum of one foot. The discharge during low flow is 1,000 c. f. s. at Wilson Creek and 1,200 c. f. s. at Lead Mines, while the average discharge at Wilson Creek is 1,800 c. f. s. and at Lead Mines 2,500 c. f. s.

11. From Lead Mines (mile 190) to Hinton (mile 62.5) the width of the river increases from 450 feet to 900 feet. The average fall throughout this reach of 127.5 miles is 4.3 feet per mile. With conditions of stream flow approaching extreme low, the average natural depth over the controlling bars in this reach is twelve inches, which depth is increased during mean stages of flow to a minimum of two feet. The discharge at Radford Dam Site (mile 151) and at Hinton (mile 62.5) during periods of low flow, is 1,500 c. f. s. and 1,700 c. f. s., respectively, while the discharge at these points, during mean stages, is 3,211 c. f. s. and 6,440 c. f. s., respectively. In this reach of the river the Virginia-West Virginia state line is crossed at mile 87.25.

12. From Hinton to the mouth of the Gauley River, the average fall per mile is 11.3 feet, while the average discharge is 6,440 c. f. s. at Hinton and 10,100 c. f. s. at the mouth of the river. The width of the river in this reach being less than in the reach immedi-

ately above, and the discharge having been increased by the flow of the Greenbrier, depths at all stages of flow are naturally considerably increased.

13. The so-called "falls" on the New River, and more especially in that reach between Allisonia, Virginia, and Hinton, West Virginia, should be more appropriately termed "rapids." Only
113 infrequently is there found a perpendicular drop and when so found, the fall is rarely more than 18 inches. Within this reach—Allisonia to Hinton—no "fall" extends entirely across the river, there always being found a natural sluice, as is evidenced by the fact that this reach was navigated by boats of shallow draft—12 inches to three feet—as early as 1819, as recently as 1936, and on innumerable occasions between these two dates. Yet there is no record of a portage of a boat ever having been necessary, although there is mention of two or three instances, during periods of extreme low water, when it became necessary to lighten the cargo.

14. In the reach between Allisonia and Hinton the proportion of shoal water to pools is 15% shoals and 85% pools. The low-water depth in the pools ranges between four and five feet.

15. The physical characteristics of the section of the river between Radford and Glen Lyn demonstrate that instead of being a nonnavigable reach, it possesses the same susceptibility for navigation found in the reaches immediately above and below it, that is, Allisonia-Radford and Glen Lyn-Hinton, admittedly navigable "locally." The fall per mile is identical, being 4.4 feet per mile throughout these three reaches, the stream flow somewhat more than Allisonia-Radford and somewhat less than Glen Lyn-Hinton, the natural depths the same—by actual measurement at summer low flow a minimum of two feet was found over all shoals between Glen Lyn and Radford with five exceptions, at each of which a minimum of at least one foot was found.

16. Possessing the same fall, stream flow, and natural channel depths as the reaches immediately above and below it, and actually having been navigated for many years prior to the completion of the railroad in 1883—even a regular passenger line by bateaux having been maintained between Radford and Eggleston Springs—this reach from Radford to Glen Lyn, had it not been paralleled by a railroad in 1883, would doubtless have experienced continued substantial navigation, as did the adjacent reaches between Hinton and Glen Lyn and Radford and Allisonia,
114 until the years 1920–1925.

17. Between 1877 and 1889 Congress appropriated and the War Department expended the sum of $110,000 in improving certain reaches of New River between Hinton and the North Carolina line, thereby increasing navigable depths in the reaches so

improved to two feet at lowest water. The project as originally recommended by the War Department, and approved by Congress, contemplated continuous improvement to effect such navigable depths from Hinton to the mouth of Wilson Creek. The total distance actually improved was approximately 63 miles, consisting of a reach 26½ miles in length extending from Hinton upstream and across the Virginia-West Virginia state line, another reach 29¼ miles in length extending upstream from New River Bridge (Radford) to Pine Creek, mile 175.5, and a third reach eight miles in length extending upstream from the Lead Mines. The object of this improvement was to facilitate navigation on New River by bateaux and to provide minimum navigable depths of two feet at lowest water, thereby making it possible for the bateaux, loaded to capacity, to operate during all seasons of the year. Before the project as originally contemplated was completed, the unimproved reaches of the section under consideration, that is, from Glen Lyn to Radford and from Pine Creek to Fries, Virginia, had been paralleled by the New River Division and the Cripple Creek Branch, respectively, of the Norfolk & Western Railroad. Thereafter, Congress failed to make further appropriations and the project as originally contemplated was not completed.

18. The channel improvements carried on by the Federal Government in the years 1877 to 1883 in the reaches of the river from Hinton, West Virginia, to Wiley's Falls, Virginia, and from Radford, Virginia, to Pine Creek produced good results. The upper portion of the improvement in the reach above the Lead Mines where the fall of the river is approximately 20 feet per mile was ineffective.

19. As far back as the oldest witnesses can recall, to wit, in the early 60's, New River was being navigated commercially by
115 bateaux or keel-bottom boats, both upstream and downstream, throughout the entire reach from Allisonia, Virginia, to Hinton, West Virginia. These river craft were from 60 feet to 80 feet in length, eight feet wide, and, fully loaded to capacity of 10 tons, drew approximately two feet of water. Partially loaded, they were able to navigate in depths of only 12 inches. This traffic, much of which moved between the States of Virginia and West Virginia, continued regularly and without interruption from the early 60's until approximately 1920, although subsequently to 1900 it was confined in large measure to the reach between Hinton, West Virginia, and Glen Lyn, Virginia, and the reach between Radford, Virginia, and Allisonia, Virginia.

20. From Civil War days until the building of the railroad paralleling New River between Glen Lyn and Radford in 1883, there was substantial, regular, and continuous river traffic between Allisonia, Virginia, and Hinton, West Virginia, shipments being

made by bateaux or keel-bottom boats having a capacity of from 7 to 12 tons. These bateaux, "plenty of them" went up and down the river between Radford and Hinton "constantly." Timber and products of the farm were shipped down the river, and store merchandise, sugar, coffee, molasses, etc., were shipped up river. This traffic continued until the coming of the railroad "cut the boat business out." The evidence touching this period discloses that this section between Radford and Glen Lyn instead of being a "nonnavigable reach" was navigated regularly just as were the reaches above and below it, until the coming of the railroad made river traffic thereupon unprofitable. It would hardly be expected that shallow draught river traffic could long survive railway competition. The case of the Snake River in Washington and Idaho abundantly illustrates this point.

21. Even after the paralleling of the river between Glen Lyn and Radford by the Norfolk & Western Railroad in 1883, the evidence discloses considerable traffic on this reach of the river for approximately 15 years.

116 22. As for the reaches between Hinton, West Virginia, and Glen Lyn, Virginia, and between Radford, Virginia, and Allisonia, Virginia, both of which remain unparalleled by railroads today, the evidence is overwhelming as to regular and continuous river traffic thereupon at all seasons of the year except when the river was frozen, and at all stages of water except in flood. This traffic has existed from the time the oldest witnesses could remember—Civil War days—down to the years 1920–1925, when the boats were supplanted by auto trucks. For a period of approximately 45 years, an average of seven to ten million feet of timber annually was transported down the New River from as far up as Narrows, Virginia, to Hinton, West Virginia, and to points below. "Millions of pounds" of tobacco, "loaded at the mouth of East River," Virginia, were transported on the river to Hinton, West Virginia. The witness Tomkies personally handled three million staves annually for a period of five years, all of which were transported to Hinton on New River. A. Knabb & Company owned five stave mills on New River and manufactured and shipped to Hinton by boat 40 thousand staves a day. This company operated every day in the year except during bad weather. The witness Owen, working for Reed Island Iron Company, transported 48 tons of pig iron per week from Reed Island Furnace to Radford. The witness E. W. Lilly personally shipped 100 carloads of timber per year for a period of 15 years from his plant at Hinton, all of which timber was transported down New River. The witness Stover during a period of six years personally handled 150 carloads of staves per year, all of which came down the river. In the single year 1880, 1,250 tons of wheat, 104 tons of

corn, and 400 tons of leaf tobacco were shipped by rail from Hinton, practically all of which came down the river by boat. This activity was not confined to downstream traffic. In 1882, immediately following a period of extreme drought, the following commodities were imported to New River Valley, coming by rail to Hinton from whence the far greater portion was transported on the river to valley destinations: Merchandise, 530 tons; sun-
117 dries, 300 tons; corn, 300 tons; flour, 190 tons; hay, 100 tons.

23. From 1880 to 1920, in the reach of the river from Radford, Virginia, to Hinton, West Virginia, an average cross ties, logs, and saw timber, was transported on New River annually by bateaux, rafting, and loose-logging. In addition thereto, large quantities of timber were transported on other reaches of the river, and throughout the entire reach from Allisonia, Virginia, to Hinton, West Virginia, a heavy tonnage of grain, tobacco, and other commodities was transported, annually, both in upstream and downstream traffic. In 1883, 25 bateaux were in operation on this reach of the river, and as late as 1912, 12 bateaux were operating between Hinton, West Virginia, and Glen Lyn, Virginia.

24. This traffic on the river was not confined to exceptional conditions or to periods of temporary high water. On the contrary, it was carried on at all seasons of the year except when the river was frozen, and at all stages of water except in flood.

25. The defendant's own witnesses establish substantial traffic on the reach of New River between Allisonia, Virginia, and Hinton, West Virginia, from as early as 1872 well on into the Twentieth Century.

26. Many of the inhabitants of New River Valley in the period 1870–1925 made their livelihood working as boatmen on New River.

27. In addition to these individuals who earned their living as boatmen, many corporations and other individuals regularly made use of New River as a medium of transporting their merchandise, products, and other materials.

28. Navigation on New River was not dangerous or hazardous, especially in that reach between Allisonia, Virginia, and Hinton, West Virginia, as is demonstrated by the fact that the record discloses no fatality in all the history of navigation on the river with the exception of the two intoxicated men who were drowned at the Giles-Pulaski county line.

118 29. A portion of the reach from Hinton to the mouth of the river was navigated by John Peter Salley in 1742, while the entire reach was navigated in 1812 by the John Marshall Party, in 1815 by Laomi Baldwin, and in 1819 by the Moore and Briggs Party, a short portage being required only

at Sandstone Falls. This entire reach was also used for many year in floating loose logs, while the reach from Hinton to Bowyer's Ferry has been navigated to a considerable extent in both upstream and downstream traffic by bateaux.

30. The reach of the river from Wilson Creek to Lead Mines, at mean and higher stages, is susceptible to navigation by light-draught boats, loose logs, and rafts and has been so used.

31. The treatment of New River by the States of Virginia and West Virginia and by the Federal Government is indicative of its navigable capacity.

32. In the Radford project basin, title to the bed of New River is not held by the owners of riparian lands, but is reserved to the State of Virginia.

33. Defendant's Radford Project is located at mile 151 on New River, between Allisonia, Virginia, and Hinton, West Virginia.

34. The New River from the mouth of Wilson Creek to the mouth of the Gauley River, in its natural and ordinary condition, is capable or susceptible of being used as a highway for commerce over which trade and travel may be conducted, among the several states, in the customary mode of trade and travel on water, and, in fact, has been so used. I find that its susceptibility to such use is not confined to exceptional conditions or to short periods of temporary high water.

35. The New River from the mouth of Wilson Creek (mile 252) to the foot of Foster's Falls (mile 183), in its natural and ordinary condition, is capable or susceptible of being used as a highway for commerce over which trade and travel may be conducted among the several states in the customary mode of trade and travel on water, and has been so used. I find its susceptibility to such use is not, and its actual use was not, con-
119 fined to exceptional conditions or to short periods of temporary high water.

36. The New River from Foster's Falls, Virginia (mile 183), to Hinton, West Virginia (mile 62.5), in its natural and ordinary condition, is capable or susceptible of being used as a highway for commerce over which trade and travel may be conducted between the States of Virginia and West Virginia in the customary mode of trade and travel on water, and was, in fact, actually so used for many years. I find that its susceptibility to such use is not, and its actual use was not, confined to exceptional conditions or to short periods of temporary high water, but that it is susceptible of such use, and was used, throughout the entire year, with the exception of short periods, occurring only rarely, during which the river is frozen.

37. The New River from Hinton (mile 62.5) to its mouth, in its natural and ordinary condition, is capable or susceptible of being used as a highway for commerce over which trade and travel may be conducted among the several states in the customary mode of trade and travel on water, and has been so used. I find its susceptibility to such use is not, and its actual use was not, confined to exceptional conditions or to short periods of temporary high water.

120 III. Effect of the Operation of Defendant's Project on Any Navigable Waters

38. The Radford power project now under construction by defendant will have a usuable storage capacity of approximately 100,000 acre-feet and a dead storage capacity in addition thereto of approximately the same volume which will not be used after the reservoir is filled. It is proposed to install machinery in the power plant with hydraulic capacity of about 9,000 cubic feet of water per second. On the average there is a flow of 9,000 second-feet or more in New River past the site of the proposed dam for only twelve days a year and a flow of 3,000 second-feet or more for not more than 141 days per year. By reason of the variance between the hydraulic capacity of the machinery and the amount of water available, it will be necessary to operate the power plant on an irregular or varying schedule, shutting it down for such intervals of time as will be required to store water in sufficient volume to operate the power plant at capacity, and then opening the plant sufficiently to permit utilization of all water available during the period of operation consonant with the maintenance of storage in the reservoir. During flood times the flow of this river at the site of the Radford project has been higher than 60,000 second-feet.

39. Practically all of the engineering witnesses testified that it would be physically possible to operate the proposed project without injuring navigation on the New-Kanawha River downstream from the project or otherwise affecting any interests of interstate commerce, but there was sharp division of opinion between engineers respecting the probable method of operation. Witnesses for the defendant expressed their opinion that the defendant would "self-regulate" the proposed project and the discharge of water passed the dam so as not to cause substantial impairment of navigability of the Kanawha River. Such opinions have no weight with this Court in determining the jurisdictional question which looks to potential operations of the project under consideration. It seems apparent that the economic interest of the defendant would encourage the use of

the large storage capacity available in that manner which would best serve the public utility system with which the Radford Project will be interconnected, and such economic self-interest
121 may, in the future, cause wide variations in the discharge through the powerhouse at times of low water. At any rate the Court cannot find that "self-regulation," as promised by the defendant, is sufficient to oust the Federal Government of jurisdiction.

Although the United States is bringing this suit against the Power Company to enjoin the construction and operation of the proposed development, manifestly, since a license in some form has been offered and is in effect again tendered in the bill of complaint, the Government cannot now be heard to say that the power development should not under any circumstances be permitted because of its effect upon the interests of interstate commerce, and the Court does not so find. Nor is it necessary for this suit that the most economic method of operation be examined by the Court to determine the extent of the effect which this project will have on lower navigation. It is sufficient for the Court to find, and it is well established by the evidence, that under ordinary practice, as the witness Schneidenhelm said, the large storage capacity available would be used to store water during times of high flow and to release it during times of low flow. Furthermore, a hydroelectric plant of this capacity (9,000 c. f. s.) located on a stream with a flow for ninety percent of the time of only about 1,200 c. f. s. and serving as a part of a large public-utility power system, would operate, it was agreed, on a peak-load basis, shutting down either wholly or nearly so some portion of each day and on week ends and operating for several hours a day at as near full capacity as the water supply, including the use of stored water, would permit.

40. Irregular operation of the power plant will be the normal method and will discharge past the dam, varying flows during those periods of the year when the flow is less than 9,000 second-feet, the irregular discharge ranging from a complete shut-off to as high as 9,000 second-feet or more, and will occur for over 96 percent of each year. The interconnection of the Radford project with the other hydroelectric and steam-generating plants of the defendant's electric transmission system justifies such avail-
able or peaking operation of the Radford power plant as a
122 feasible and economical method of supplying the load of that system during those hours of each working day when the power demand is heavy.

41. From the statements of the last-mentioned and other witnesses the Court finds that the flow past the Radford dam in times of low water may vary from a flow approaching zero to a max-

imum of 9,000 c. f. s. and the principal adverse effect upon the river below will be caused by such variation in flow. It seems to be agreed that the normal operation of the proposed project would, in times of low water, result in an average flow substantially higher than the recorded minimum low-water flow at the dam site which would increase the low-water flow in the Kanawha and Ohio Rivers into which it flows. The Court further finds that if the high flows are stored in the reservoir and released during low-water periods, a beneficial effect which must follow will be the consequent deepening of the navigable channel below at such times of release. As a sequitur, the Court finds that if the Radford storage reservoir is available for catching flood waters, as it may well be in normal operation, there may be substantial lessening of flood heights below. All of these effects will be reflected in the commercial use of the lower waters, and hence will affect the interests of interstate commerce.

42. There was further conflicting testimony as to the probable extent and effect of intermittent operation of the Radford power project and the opinions of engineering witnesses on both sides were supported by involved calculations. It was agreed, however, that if the flow past the proposed dam should be considerably increased within the range of possibilities for that short period of hours necessary for daily peak-load operation during low-water stages, there will be a variation in flow on the presently used portion of the New-Kanawha River and that by reason of the large contribution made by the drainage area above Radford to the flow at Kanawha Falls during low-water periods such variations of the New River flow at Radford will affect the navigability and the navigable depth of the Kanawha River. It follows as a matter of course that the concomitant effect on the intervening stretch of New River from the dam to Kanawha
123 Falls will be greater than that on the Kanawha itself.

43. The flow of New River from above the Radford dam site of the defendant furnishes a large proportion of the flow of the Kanawha River at the head of steamboat navigation thereon, and in times of low flow has contributed as high as 70 percent of the flow of the Kanawha at its mouth. The official records show that during many months of low flow from one-half to three-fourths of the flow of the Kanawha River at its mouth originated above the Radford dam site. During 30 periods of record 54 percent of the entire Kanawha River flow came from this source. During six months of the year 1930, from June 1st to November 30th, inclusive, 58 percent of the flow of the Kanawha River was contributed by the New River above Radford.

44. During low-water seasons the flow of the Kanawha River is generally large in comparison with that of the upper Ohio River

at their junction. During the week of August 24th to 31st, 1918, the flow out of Kanawha River was almost four times the flow of the upper Ohio River, and during other periods in that year was twice as large as the flow in the Ohio River. In the years 1920, 1923, 1929, and 1932, the flow out of Kanawha River and into the lower Ohio River at times substantially exceeded the flow from the upper Ohio River. No less than 22 per cent of the flow sustaining navigation on the Ohio River above Cincinnati during thirty critical low-water periods of the fifteen years from 1918 to 1932 inclusive, came from above the Radford dam site. During annual low-flow periods on the Ohio and Kanawha Rivers the entire flow of New River, unimpeded, is necessary for navigable purposes in the Kanawha and Ohio.

45. Slack-water navigation is maintained on the Kanawha River by means of two concrete roller-gate dams, one located at Marmet and one at London, and six wicket dams, three of which will be removed when a third concrete dam with roller gates is completed at Winfield. Another concrete dam with roller gates is under construction on the Ohio River at Gallipolis down-
124 stream from the mouth of the Kanawha, which will complete the improvement increasing the channel depth from six feet to nine feet throughout. Below the Gallipolis dam, slack-water navigation on the Ohio River is maintained by means of wicket-type dams now in operation. There is considerable leakage through the wicket dams; and it is necessary to continually caulk and "needle" the wicket dams to maintain the water level in the upstream pools above such dams for navigation.

46. Navigation on the Kanawha and Ohio Rivers will be interfered with by the great variations in flow due to operation of the Radford project on peak loads. Power waves will be transmitted by peak load operation of the Radford power plant from Radford, Virginia, to the Kanawha River and there pass through the slack water pools behind the London, Marmet, and Winfield dams maintained at closely fixed levels, thence through the pool which will be created by the Gallipolis dam now under construction and so into the pools behind the wicket dams in the Ohio River below Gallipolis. Such irregular artificial fluctuations due to peak loading cannot be anticipated by navigators on either the Kanawha or Ohio Rivers and either an increasing or decreasing flow caused thereby will interfere with the operation of boats on those streams. Such artificial variations in flow on the Kanawha and Ohio Rivers will make it difficult to enter locks located at the dams or to pass through chutes or narrow places in the river channel of the Kanawha River and must be checked by constant operation of the gates on the dams, and if not checked will cause groundings in boats operating on the rivers.

47. It is reasonable to expect that the location of the defendant's proposed power plant with a usable storage of 100,000 acre feet at Radford, Virginia, with the ability to fluctuate the pool levels of the presently used Kanawha River will cause apprehension among prospective shippers on the Kanawha River, resulting in retarded development of such shipping facilities and hence will affect an interest in interstate commerce.

48. The defendant has not secured the consent of Congress or the approval of the Secretary of War and Chief of Engineers required under the Rivers and Harbors Act of March 3, 1899, 125 for the construction and operation of its Radford Project.

49. The power output of the two power plants at London and Marmet, located on dams owned and constructed by the United States, must necessarily be dependent upon the flow of water reaching those dams from above and upon the time such flow reaches these plants. If the flow of the Kanawha River should be varied as the Court finds it may be varied by the Radford project, the property interests of the United States in the power developments on the Kanawha River would be affected.

50. A comprehensive plan for the first step in Federal improvement of the New-Kanawha River is shown by the purchase of large tracts of land in the upper drainage basin and the proposed acquisition of additional loads and in the recommendations of the Chief of Engineers and Secretary of War to Congress contained in Ex. 145. The comprehensive character of such river development needs no support in engineering testimony, but witnesses for both sides testified to the desirability of coordinated operation of developments on this river.

51. The construction and operation of the defendant's Radford project will obstruct the navigable capacity of navigable waters of the United States, namely: The New River, the Kanawha River, and the Ohio River.

52. The construction and operation of the defendant's Radford project will alter and modify the condition and capacity of the channel of navigable waters of the United States, namely: The New River, the Kanawha River, and the Ohio River.

53. The construction and operation of the defendant's Radford project will affect the interests of interstate commerce as related to navigable waters of the United States, namely: The New River, the Kanawha River, and the Ohio River.

54. The flood flow on New River above the Radford project is at times so great as will necessitate the synchronized control and operation of the Radford project in conjunction with other projects on the New and Kanawha Rivers under Federal license in order to lessen the dangers and destruction by floods on these rivers.

126 CONCLUSIONS OF LAW

1. New River from the mouth of Wilson Creek to the mouth of the Gauley River is in fact and in law navigable waters of the United States.

2. New River from the mouth of Wilson Creek (mile 252) to the foot of Foster's Falls (mile 183) is in fact and in law navigable waters of the United States.

3. New River from Allisonia, Virginia, to Hinton, West Virginia, is in fact and in law navigable waters of the United States within the meaning of the Act of Congress of 1899, Chapter 425; 30 Stat. 1151. Irrespective of whether the river is navigable below Hinton or above Allisonia, the reach between these points, wherein is located defendant's Radford project, provides an avenue of commerce between the States of Virginia and West Virginia, and is, therefore, navigable waters of the United States.

4. New River from Hinton (mile 62.5) to its mouth is in fact and in law navigable waters of the United States.

5. The erection of defendant's Radford Dam and other works without approval of the Secretary of War and without the consent of Congress is in violation of the Act of 1899, Chapter 425; 30 Stat. 1151, and of the Federal Water Power Act as amended.

6. The construction and operation of the defendant's Radford project is without specific authority of law, and in violation of Sections 9 and 10 of the Rivers and Harbors Act of March 3, 1899.

7. Construction of the defendant's Radford project is in violation of the provisions of the Power Act.

8. New River at the site of the proposed Radford dam is a stream subject to the jurisdiction of Congress under its authority to regulate commerce with foreign nations and among the several states.

9. The finding of the Commission of June 1, 1927, that the construction and operation of the Radford project would affect an interest in interstate commerce is fully supported by the evidence and should not be disturbed.

127 10. For the safest, most efficient, and useful control of the flow of the New and Kanawha Rivers for flood, navigation, power, and other public uses, a synchronized control of all dams and power projects on New River from the North Carolina state line north under a Federal license is necessary, and requires the defendant to operate its Radford project under a federal license.

11. The Commission upon the evidence and the law is entitled to a decree requiring the defendant either to accept the license

tendered or remove the obstruction which it has placed in the channel of New River above Radford.

Respectfully submitted.

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United States District Attorney.

I hereby certify that the foregoing is a true and correct copy of a paper filed by counsel on December 2, 1938, under the jointly signed stipulation of counsel for use as therein specified, and to be included in the transcript of the record in lieu of plaintiff's original request for findings of fact and conclusions of law, and plaintiff's supplemental request for findings of fact and conclusions of law, filed in this court on March 4, 1937, and the 10th day of August 1937, respectively.

C. E. GENTRY,
Clerk, U. S. District Court.

From the foregoing restatement of plaintiff's requested findings of fact have been omitted the supporting record references originally included for the benefit of the District Court.

133 In United States District Court for the Western District of Virginia, at Roanoke

In Equity No. 8

THE UNITED STATES OF AMERICA

vs.

APPALACHIAN ELECTRIC POWER COMPANY, A CORPORATION

On final hearing of a suit in equity to enjoin the construction of a dam and electric power plant on New River in the State of Virginia.

Before PAUL, District Judge.

Harry W. Blair, Assistant Attorney General; Huston Thompson, Special Assistant to the Attorney General; John W. Aiken, Wayne C. Williams, Allan D. Jones, Special Assistants to the Attorney General; John A. Skiles, L. A. Gellis, Special Attorneys; Oswald Ryan, General Counsel, Federal Power Commission; Willard W. Gatchell, Attorney, Federal Power Commission; Joseph H. Chitwood, U. S. District Attorney, *for the Plaintiff;* Newton D. Baker, Raymond T. Jackson, of Cleveland, Ohio; M. F. Millikan, of New York City; A. Henry Mosle, Creswell M. Micon, Fraser M. Horn, Wendell W. Forbes, of New York City; John S. Draper, of Pulaski, Va.; John L. Abbott, of Lynchburg, Va., *for the Defendant;* Abram P. Staples, *Attorney General of Virginia* (*for the State of Virginia*); Homer A. Holt, *Attorney General of West Virginia* (*for the State of West Virginia*).

134 OPINION BY THE COURT

THE NATURE OF THE CASE AS STATED IN THE BILL, AND THE ANSWER THERETO

The cause of action set out in the bill of complaint, stated briefly and in substance, is as follows: That the defendant, a Virginia corporation, engaged in the business of producing, distributing, and selling electric power, has begun and is continuing the construction of a dam across the New River near Radford in Pulaski County, Virginia, for the purpose of impounding the waters of that river and utilizing the same for generating electric power. That the New River is a stream which arises in the northwestern part of the State of North Carolina and flows in a general northerly and northwesterly direction across the State of Virginia, into the State of West Virginia, in which latter state, after joining with the Gauley River, it becomes known as the Kanawha River and, under the latter name, continues to flow in a general northwesterly direction until it discharges into the Ohio River at Point Pleasant, West Virginia. It is alleged that the New River and the Kanawha constitute one continuous stream and that it is a navigable interstate stream constituting a navigable waterway of the United States and that the New River, at the point where defendant's dam

is being constructed, is a navigable water of the United States and said dam is being constructed in and across a navigable water of the United States. It is alleged that the plaintiff has recently expended and is continuing to expend large sums in improving the conditions and facilities of navigation in that portion of the stream known as the Kanawha River. That defendant's project at Radford would, by impounding the waters of New River, not only render New River impossible of navigation during long periods of each year but would seriously impair navigation upon the Kanawha River.

It is alleged that the defendant, before proceeding with the construction of its Radford project, applied to and obtained from the State of Virginia a license to construct the same, and that defendant is proceeding under the purported authority of said license. But that the acts of defendant are being
135 performed without the consent of Congress and without any permission or authority of the Secretary of War and without having obtained any license from the Federal Power Commission and that such acts are in violation of the laws of the United States, and particularly in violation of what is known as the Rivers and Harbors Act of March 3, 1899 (33 U. S. C. 401, 403) and of the Federal Water Power Act of June 10, 1920 (16 U. S. C. 791–823).

It is further alleged that in June 1926 there was filed before the Federal Power Commission by the New River Development Company, a predecessor in interest of defendant, a declaration of intention to construct the dam at Radford and that in September 1926 the New River Development Company transferred its rights in such declaration of intention to the defendant, which thereafter continued the presentation of the same to the Federal Power Commission. That the Commission, after causing an investigation to be made and considering the plans of defendant's project, made a finding that said project would affect the interests of interstate commerce. That notwithstanding said finding, the defendant, without obtaining a license from said Federal Power Commission, began its construction of said dam, on or about June 1, 1934, and is proceeding with the same.

Based upon its allegations that the stream in which the dam is being constructed is a navigable water of the United States and that the construction of the dam will obstruct and impair interstate commerce on the New River and on the Kanawha River and will affect the interests of interstate commerce, the bill prays (a) That the defendant be enjoined from constructing or maintaining its project otherwise than under a license to be issued by the Federal Power Commission, or in the alternative (b) That the

Court issue a mandatory order requiring the defendant to remove any and all parts of the project from the limits of New River.

In addition to the essential facts above recited, the bill contains much matter in recital of evidential facts upon which it bases the contention that the New River is navigable and that the construction of this dam will impede navigation on it and on the
136 Kanawha. This matter need not be recited here. So far as it is proven by evidence and is material, references will be made to it in the later discussion.

The Answer

The answer, briefly summarized, avers in substance the following matter in defense to the bill of complaint: The defendant admits that it has begun and is continuing the construction of the project at Radford. But denies that such construction is in any way unlawful. It denies that New River is a navigable stream over which the United States has jurisdiction and control but, on the contrary, avers that it is a nonnavigable stream and, at the point of the proposed project, is subject only to the jurisdiction and control of the State of Virginia. It avers that the defendant now owns the lands which will be affected by the construction of the dam and that the project does not require or involve the use of any lands or other property of the United States; and that, being the owner of all lands affected, the defendant has a full and complete proprietary right to construct its water power project, subject only to such regulations as the State of Virginia may impose. That permission to construct said dam has been granted by the State of Virginia, in pursuance to application therefor, and that said project is being constructed pursuant to a license granted by the State of Virginia and in conformity to the conditions and restrictions imposed by said State.

Defendant admits that the Kanawha River, lying wholly within the State of West Virginia and into which New River flows, is a navigable stream and that the plaintiff has developed the Kanawha for the improvement of navigation thereon. But it avers that the head of navigation, even with this development, is at a point in the Kanawha downstream from the point of inflow of the New River, that the New River is not and never has been navigable and that the project of defendant is located on the New River approximately 155 miles upstream from the head of navigation on the Kanawha. Defendant avers that neither the construction nor operation of its project will interfere with or obstruct navigation or the navigable capacity of

any navigable water of the United States; that the defendant intends and has declared its intention to so operate its proj-
137 ect as not to interfere with or obstruct such navigation or navigable capacity and that, even if this were not true, it would be impossible for said project, in the course of any known or practicable method of operation, to interfere with or obstruct or in any way adversely affect navigation or the navigable capacity of any navigable waters of the United States. That the laws of Virginia under which the license from that state was issued protect any rights of the United States and that in any event the Secretary of War has power summarily to remove any obstruction if any such occur.

The answer further states that it is true that New River Development Company, predecessor in interest of defendant, filed a declaration of intention with the Federal Power Commission in respect to the Radford project, but says the date of such filing was on or about June 26, 1925, and not June 26, 1926, as alleged in the bill. And admits that all rights and obligations under said declaration of intention were transferred to defendant on September 2, 1926, and that defendant continued presentation of the same before the Commission. It states this declaration of intention was presented for the purpose of obtaining a finding that neither the construction nor operation of defendant's project would affect the interests of interstate commerce. It avers that on June 1, 1927, the Federal Power Commission made a finding that the portion of the New River involved by defendant's project is not "navigable waters" within the meaning of the Federal Water Power Act, which finding was correct. But, it avers, the Commission also made a finding that the proposed construction would affect the interests of interstate commerce, which latter finding, the defendant avers, is erroneous and arbitrary, is unsupported by evidence and contrary to the evidence and facts before the Commission. That the defendant, although challenging the existence of any jurisdiction in the Federal Power Commission over the project, nevertheless offered to accept Federal license containing such conditions relating to the manner of construction and operating such project as are necessary and appropriate to prevent interference with the navigable capacity of the Kanawha River. But that the Commission refused to issue such a license and insisted that defendant should accept a license containing the conditions provided by the Water Power Act for projects located on navigable waters, contrary to the finding of the Commis-
138 sion that the project was upon a nonnavigable stream.

That the license tendered by the Commission, known as the standard form license, contained many conditions which have

no substantial or reasonable relation to the interests of interstate commerce or to the protection of the navigable capacity of any navigable waters of the United States; that these conditions are beyond the power of the Federal Power Commission of the Federal Government to impose as a condition to defendant's right to build and operate its project. That the tendered license contains unauthorized and unconstitutional conditions and requirements which have no relation to the protection of navigation or navigable capacity and which would restrict defendant's use of its property and depreciate the value thereof; and that defendant refused to accept the tendered license. That, even if it be held that defendant's project is located upon a navigable stream or is so located as to affect the navigable capacity of a navigable water and that a license from the Federal Power Commission is required therefor, the conditions of such license must be limited to those having a reasonable relation to the protection of navigation or navigable capacity and cannot include conditions having no relation to such matters.

The defendant avers that the Federal Power Commission and the Chief of Engineers of the United States Army, as agencies of the plaintiff, have made findings that New River is not a navigable stream and that plaintiff is thereby estopped to question its nonnavigability. And finally the defendant avers that no valid cause of action is stated by the bill because it shows no present damage to or invasion of plaintiff's rights but only an assumed and hypothetical invasion; that the alleged effect of the construction and operation of the project upon interstate commerce is merely a speculative hypothetical and conjectural effect which could be produced only if defendant, at some future time, were to operate its project in a fanciful and impracticable manner, and that there is no showing of any intention on the part of defendant to operate in such manner; that the assumed possibility of producing an effect on interstate commerce by operation of the project is predicated solely upon conjecture that it is physically possible for defendant so to operate it, although it has never done so, has never proposed to do so and has expressly asserted
139 that it intends not to do so.

Upon the filing of the answer the plaintiff submitted a motion to strike it upon the usual ground of insufficiency. Argument upon this motion was at length and covered substantially every issue of law involved in the case. The Court, being of opinion that an accurate and proper application of the pertinent legal principles could be arrived at only after full development of all facts, denied the motion to strike the answer. Upon argument of this motion the State of Virginia and the State of West Virginia, appearing by their respective Attorneys General, who al-

leged that these states had a material interest in the litigation, were granted leave to appear amici curiae and filed briefs.

Upon the trial of the case, the testimony of witnesses and the exhibits introduced produced a record voluminous beyond description. For this the Court is, no doubt, in some measure responsible. In an effort to ascertain all pertinent information bearing on the issues involved, much latitude in the introduction of evidence was allowed. And industrious counsel armed with every facility for research, historical and scientific, responded to the opportunity offered. The result is a record of evidence so extensive that no effort to recount it or even to summarize it is possible. Such references as are made to the evidence must necessarily refer to it in the most general way and to facts established by the weight of it.

The Streams Involved

It appears necessary to a proper consideration of the issues involved in this case that there should first be determined whether New River is a navigable stream. To this end a description of the course of the New and Kanawha Rivers, their physical characteristics and other facts pertinent to the questions involved is desirable.

The New River has its sources in two mountain streams in the northwestern part of the State of North Carolina, known as the north and the south forks of the river. These, uniting to form the New River at a point near the North Carolina-Virginia state line, flow into Grayson County, Virginia. A mile or so after entering Virginia, they are joined by Wilson Creek. Most of
140 the maps, profiles, etc., introduced in evidence show the course of the river to the vicinity of Wilson Creek and that point may be said to be taken as the head of the River for the purposes of this case. References to distances, etc., hereafter made will treat the mouth of Wilson Creek as the head of New River. Beginning at the mouth of Wilson Creek, the flow of the river is practically due east for about 25 miles. It then turns in a generally northeasterly direction for approximately 100 miles, during which it passes through portions of the counties of Grayson, Carroll, Wythe, and Pulaski. Below Radford, in Pulaski County, the river turns generally northwestward through Giles County and crosses the Virginia-West Virginia state line at a point about 160 miles below its head (the mouth of Wilson Creek). After crossing into West Virginia, it flows north for about 25 or 30 miles to the City of Hinton and thence inclines to the northwest and flows about 65 miles in that general direction to Gauley in Fayette County, West Virginia, where it forms a junction with the Gauley

River, which comes in from the east. Below this point the stream resulting from the junction of the New and the Gauley is known as the Kanawha River, which continues in a northwestward direction about 95 miles to junction with the Ohio River at Point Pleasant, West Virginia. Immediately below the junction of the New and the Gauley (1 or 1½ miles below) is the point known as Kanawha Falls, which will hereafter be frequently referred to. Kanawha Falls is a precipitous rapid with a fall of 16 feet. This point may be said to be the head of the Kanawha River and the planned head of navigation on the Kanawah is just below Kanawha Falls. For convenience, the stream below the junction of the New and the Gauley will be referred to as the Kanawha River; the designation New River will apply to the stream commonly known by that name and extending from the mouth of Wilson Creek to the junction with the Gauley River. The distance from the mouth of the Kanawha up to the mouth of Wilson Creek is approximately 347 miles; and from the mouth of New River (at Gauley) up to the mouth of Wilson Creek is about 252 miles. These distances are measured in the course of the stream which, particularly in New River, is marked by many large bends or loops.

141 The elevation above sea level at the mouth of Wilson Creek is about 2,440 feet; at the mouth of New River (at Gauley) 651 feet; at the mouth of the Kanawha about 500 feet. The elevation at Kanawha Falls, head of navigation on the Kanawha, is 620 feet. It will thus be seen that the fall in the Kanawha from Kanawha Falls to the Ohio River is 120 feet in a distance of 96 miles, or 1.25 feet per mile; while the fall in New River from the mouth of Wilson Creek to Gauley is 1,789 feet in a distance of 252 miles, or 7.1 feet per mile. The slope in New River, however, is not uniform throughout its length. For example, from Wilson Creek down stream for about 40 miles the fall is fairly uniform at a rate of about 5.7 feet per mile, while in the next succeeding 18 miles there is a fall of 260 feet, an average of 14.4 feet per mile. Nor are the steeper slopes of the river confined to its upper reaches, for we find that in that portion of the river between its mouth and the gauging station at Caperton, West Virginia, 17 miles above, there is a fall of 289 feet, or 17 feet per mile. These variances in slope occur throughout the course of the stream. The project of defendant which is the subject of dispute is located at a point about 5 or 6 miles upstream from the town of Radford, Virginia, and is approximately 100 miles below the mouth of Wilson Creek and about 152 miles above the mouth of New River. It is at an elevation of about 1,730 feet above sea level. In this portion of the river, and for some miles above and below, the slope of the river is fairly uniform at from 5 to 8 feet per mile.

The variations in the slope occur at short intervals and the river, throughout its entire length, consists of a series of pools of comparatively still water separated by shoals or rapids. The pools vary in length from a few hundred yards to as much as several miles, with a probable average length of less than a mile. The rapids also vary in extent and also in the degree of fall. Rapids of 2,000 feet are not uncommon and some are of much longer extent. In some of them the water falls almost vertically for from 3 to 6 feet. The slope of the river is such as tends to a rapid run-off of the water and to high velocities in the current of the stream, particularly through the shoals or rapids. Throughout its length the bed of the stream is rocky, being across ledges of limestone and sandstone and, at many places, with boulders
142 and jutting rocks above the surface of the water. In the course of a report made by the Secretary of War to the House of Representatives in 1935 (74th Congress, House Document No. 91) there is contained the following general description of New River which is here quoted because of its brief but accurate description of the general characteristics of the stream.

"Throughout almost its entire length the river flows through a rugged mountainous country. Its valley is narrow, the flood plain being very little wider than the low-water channel, which varies in width from about 200 to 1,000 feet. In many places the banks are sheer bluffs rising from the river's edge. Ledges of limestone, sandstone and shale crossing the river at frequent intervals create rapids and waterfalls. The waterfalls vary in height up to about 18 feet. Between the ledges there are usually short pools of varying depths. The low-water depth in the channel varies from a few inches to more than six feet."

In its course the New River has a number of tributary streams. The principal ones of these are Reed Creek, Reed Island Creek, and Mack Creek which enter above the site of defendant's project, and Little River, Walker Creek, Indian Creek, and Bluestone River which enter between the site of defendant's project and the City of Hinton, West Virginia. At Hinton the New River receives Greenbrier River, its largest tributary. Between Hinton and the mouth of New River there are few, if any, tributaries of any moment. One peculiarity of the river is that the section from Hinton to the mouth of the river is more steep, rough and rugged than any other section. A few miles below Hinton the river enters what is known as the gorge through which it flows for approximately 45 miles in a narrow and tortuous channel between high mountains. The bed is a mass of sharp ledges and boulders and through this, with the steepest slope in its entire course, the water rushes with great velocity.

The drainage area of the entire New River is 6,918 square miles. The drainage area at the site of defendant's project is 2,400 square miles. Due to seasonal variations in precipitation and the slope of the stream there is a wide fluctuation in the volume of flow. At the site of the defendant's project, the average flow over a period of 28 years ending September 30, 1935, was 3,211 cubic feet per second, but the flow is less than this for sixty-five percent of the time. The lowest flow know at this point was 521 second-feet on September 6, 1930. The greatest flows known at this point
143 occurred during floods in 1878 and 1916 and were estimated to be about 155,000 second feet and 146,000 second feet respectively. At the mouth of New River, the average flow over a period of years is stated to be 10,100 cubic feet per second, and the average flow of the Gauley River at its mouth 2,600 feet per second. At Kanawha Falls which, as stated, is the head of the Kanawha and immediately below the junction of the New and the Gauley, the records for 56 years show an average flow of 13,000 second-feet, a maximum of about 270,000 second-feet on September 14, 1878, and a minimum of 640 second-feet on August 15, 1930. The drainage area at Kanawha Falls is 8,300 square miles.

From these figures it will appear that, while the flow in New River is subject to wide variation, the river carries a large volume of water in the course of a year. There is no denial that the volume of water passing through the stream over any extended period would be sufficient for purposes of substantial navigation provided other conditions obtained which made it available for that purpose.

The Kanawha River, extending about 95 miles from Kanawha Falls to Point Pleasant, carries the waters delivered by the New and the Gauley rivers as well as that of tributary streams entering below Kanawha Falls. While there is some variation in the slope of the Kanawha, it is faily uniform and comparatively small, averaging about 1.25 feet per mile throughout its course. It is conceded that Kanawha is at present a navigable stream, and that the Federal Government has developed, and is developing, its navigable capacity by a series of dams and locks which will permit of substantial navigation to a point shortly below Kanawha Falls.

QUESTION OF THE NAVIGABILITY OF NEW RIVER

In regard to the navigability of New River, the following, each briefly and generally stated, are the contentions upon which the plaintiff appears mainly to rely:

(1) That the names Kanawha and New are names given to different portions of the same stream and that they comprise one

stream which must be treated and dealt with as a whole. That its actual and conceded use for purposes of navigation (in the lower reaches) imparts to the stream as a whole the status of a
144 navigable water over which the Federal Government has control.

(2) That the states of Virginia and West Virginia have dealt with and treated the New River as a navigable stream. That the Federal Government has done likewise and has, in the past, appropriated and expended funds for the improvement of the navigable capacity of the river.

(3) That New River has in fact, in past years, been used for the movement of commerce in substantial amounts between the states of Virginia and West Virginia and that it is now available for and susceptible to such use.

(4) That, aside from the question of actual present use in interstate commerce, the New River is susceptible of development for the purpose of commercial navigation.

Lack of Navigability Below Hinton

The matter set out in (1) above needs only brief discussion. The Kanawha and the New rivers are one stream only in the sense and to the extent that this is true as to any stream and its largest tributary; but the fact that any river may in any portion of its course be navigable and subject to such control as the United States may have over navigable waters does not invest every tributary of such river with the same status. To hold otherwise would be to extend the status of a navigable water, with all the consequences thereof, to the remote sources of the tributary streams, the mountain brooks and spring branches which are the ultimate sources of so many of our great rivers. In the instant case, it happens that a sharp difference in the physical characteristics of the Kanawha and the New rivers serves to emphasize the fault in plaintiff's contention. The Kanawha is a comparatively placid stream, fairly deep, and with a slope of only 1.25 feet per mile. The limit of these characteristics is distinctly marked by Kanawha Falls. Above that point is the New River, running over a bed of rocks and ledges, a stream of irregular but steep descent and of high velocity. The lack of identity for purposes of navigation is further emphasized by the fact that the lower portion of the New River (for about 50 miles above Kanawha Falls) is the most turbulent and precipitous of the entire river and forms a barrier between the navigable Kanawha and any possibly navigable waters of the New.

145 It is this stretch from the mouth of the New River up to near Hinton which was described as "an impetuous and

almost resistless torrent" in the course of a report to the Secretary of War in 1828 and transmitted to the House of Representatives. In other portions of the same report it is said: "Numerous falls and rapids occur, over which the water rushes with deafening impetuosity." And in a report to the Chief of Engineers, made by N. H. Hutton, Assistant Engineer, in 1876, it is said of certain portions of this stretch of New River that: "the masses of rock cumbering the waterway appear at times almost to have absorbed the river * * *." In 1912, Major F. W. Altstaetter, Corps of Engineers, reported to the Chief of Engineers:

"From Hinton to the head of slack water in the Kanawha, a distance of 64 miles, the fall is almost 750 feet. There are many bridges and steep rapids along this portion, including Kanawha Falls, which is about 16 feet high. This whole section is unfavorable for navigation and *the river above it could not be connected with navigation in the Kanawha by the expenditure of any reasonable amount. The navigation between Hinton and Radford must therefore be considered as having no outside river connection.*" [Italics by this Court.]

From these reports, as well as from other evidence in the case, I think it clear that that portion of the New River from Hinton (or a few miles below) to Kanawha Falls is not navigable and never has been and is not practicably susceptible of being made navigable. I find also that while, some 60 or 70 years ago, investigations were made and tentative plans suggested for canalizing this portion of the river for purposes of navigation, no steps were ever taken for this purpose and no attempts to render it navigable have ever been made and none are now in contemplation. Due to the plainly nonnavigable character of the New River from its mouth up to Hinton, it is evident that there is and can be no connection between navigation on the Kanawha and any alleged or actual navigation on the New River; and that the plaintiff's contention that New River is a navigable water of the United States must rest on evidence that the river possesses that character from Hinton upward.

146 Evidence as to Navigability above Hinton

In fact, the evidence introduced by plaintiff, and its argument thereon, as to the navigability of New River relate to that portion of the river extending from some distance above defendant's project to Hinton, in the course of which the river flows from Virginia into West Virginia. It is this stretch of the river which plaintiff seeks to prove has been used and is available for the movement of interstate commerce. The evidence offered on this issue by both parties is varied and voluminous. It consists of

histories, tales of exploration, the reports of commissions, acts of Congress and of state legislatures, official reports made by the Corps of Engineers of the United States Army, maps, profiles, photographs, etc., to which is added the oral testimony of old inhabitants and other persons. No attempt can be made to recite it, even in brief.

I am unable to agree with plaintiff's contention that the early historical descriptions of New River show its availability for navigation in its natural state. These descriptions, beginning with the exploring trip of John Peter Sally in 1742, are of trips of exploration or investigation along the course of New River and, in some cases, of its tributaries. They indicate that the explorers were impressed with the size of the stream and the wild beauty of the scenery along its course, and also that they were impressed with the rapid flow of the stream and its precipitous fall. It is true that large parts of these exploring trips were made by boat along the river, but there is nothing to indicate that the boats used were anything larger than was necessary to hold a few men and their limited and scanty supplies. And even so, these accounts are replete with recitals of the difficulties encountered by the rapids in the river and of frequent portages to overcome them.

No doubt since persons first settled along this river they have had small row boats which they have used to move about on the river adjacent to their lands, for purposes of fishing or to cross the river for business or social errands, but this is not navigation in commerce. The first knowledge of anything which could
147 be construed as commercial navigation is the reference to the use of keel boats in various portions of the river. Just when such use began is not known, but we have knowledge of it following the Civil War and prior to 1873. In 1872 Congress provided for a survey or examination to be made of New River from the mouth of the Greenbrier River at Hinton, West Virginia, to the load mines in Wythe County, Virginia, which latter point is about 30 miles up-stream from defendant's project. Pursuant to this such survey was made and a report thereof made to the Chief of Engineers by inferior officers assigned to the work. This report included a general description of the course and character of the stream and a mile to mile description of the portion surveyed. In this report, reference is made to "the present system of transportation on this portion of the river by keel boats, which carry from two to three tons, and are floated down the river and poled up," and it is stated that an expenditure of $100,000 "would greatly ameliorate the condition of the river for this trade, and would enable the trips to be made with so much more certainty as to induce a considerable increase of trade." Additional surveys and reports were made, resulting finally in the adoption of a plan

to create a channel 30 feet wide and 2 feet deep at low water, suited for the "keel boats now in use." It will thus be seen that keel boats were in use on the river prior to any Federal improvement and that the improvements were proposed for facilitating the use of these boats.

In 1876 Congress appropriated $15,000 for work on New River and appropriations were continued (although not each year) until 1886, the total appropriations amounting to $112,000. Pursuant to these some work was done in each of the years from 1877 to 1882, inclusive, and a small amount in each of the years 1885 and 1889. The work was confined to making channels through shoal portions of the river, but did not include all of the shoals or falls, and on some of the more precipitous ones no work was done. Neither was the improvement continuous in extent but was divided along three different sections of the river. One of these sections, described by the engineers as the "Lower or Greenbrier Division, extended up-stream from Hinton. The next section, referred to as the "Middle or New River Bridge
148 Division," began about Radford, Virginia, and extended up to the lead mines in the neighborhood of Austinville, in Wythe County, Virginia. The third section, known as the "Upper or Lead Mines Division," was from the lead mines toward the head of the river.

On the lower or Greenbrier Division some work was done each year from 1878 to 1882, inclusive, and by the latter year had reached as far as Wiley's Shoals, which is about 26 miles above Hinton. No further work was done on this division above this point and no work was done after 1882. On the middle division, work began at New River Bridge, some 54 or 55 miles above the state line between Virginia and West Virginia, and some work was done in each of the years 1877, 1878, 1880, 1881, and 1882, in the course of which the work reached a point approximately 30 miles upstream to the vicinity of Allisonia. Work on this division was also discontinued in 1882. On the upper division, a small amount of work was done in each of the years 1881, 1885, and 1889, the total of which was only 7.9 miles. After the work done in 1889 on this portion of the river, there remained an unexpended balance of several thousand dollars of the appropriation allocated to this division and, upon the recommendation of the local engineer that further expenditure was inexpedient, this balance was not expended. It was later returned to the Treasury upon the repeal of the act providing for the prosecution of the work.

The keel boats, sometimes referred to as bateaux, mentioned in the evidence are described as flat-bottomed boats from 50 to 70 feet long, with a width of 6 to 8 feet, and a draft of about 2 feet.

They were moved by poling or towing. They are variously referred to as having a carrying capacity of from 2 to 3 tons up to 10 to 12 tons. In use it is probable that the load varied with the stage and velocity of the stream flow and probably the carrying capacity increased with the improvements made in the channel. The evidence indicates that the use of these boats was local, by which it is meant that they were not used in continuous trips throughout the course of the river, but were used on separated stretches of the river where conditions made their use per-
149 missible and desirable. The range of their movement was determined by the extent of the pools and the absence of steep shoals in that particular section of the river. For example, from Hinton upward for 23 or 24 miles the river has the least gradient in its course, about 4 feet per mile, with considerable pool water and few precipitous shoals. The same conditions obtain to a more or less extent on the section of the river for 25 or 30 miles above Radford. It was in these separated stretches of the river that practically all of the bateaux navigation took place and only on them that there was any appreciable trade or commerce by boat. It is not meant to say that continuous movement of such boats between Hinton and the vicinity of Radford was impossible or did not occur. There is evidence which indicates that it did occur, but there is a vagueness about the extent to which it occurred and indications that such trips were irregular, were attended with difficulty, and formed no appreciable part of any commercial transportation which took place on the river. The most definite evidence of the extent of navigation on the river are the reports of the government engineers both before and after beginning improvement of the river in 1877, and these reports repeatedly state that the commercial navigation was local to separated stretches of the stream and that there was no continuous navigation.

It is difficult to determine the extent to which the volume of the keel-boat traffic was affected by the improvements made on the river, but it does appear that the work done by the Federal Government in no way altered the local character of this navigation, and apparently it was not intended to. As stated, no attempt was made to create a continuous channel throughout the course of the river. The work was confined to improvement in each of several separated sections and was with a view to facilitating the keel-boat traffic in the limited localities where it already existed. The reports of the engineers in charge of the work indicate that their main object was to facilitate the carrying of local products by boat to the railroad outlet for that locality. In the annual report of the Chief of Engineers in 1883, after the work on the lower and middle divisions of the river had terminated, it is said:

150 "It has hardly been practicable to accomplish at any one of the very many points needing improvement all that has been desirable, but the worst places have been worked upon to the greatest extent and efforts thus been made to increase the available navigability of the river over as long stretches as possible, and to increase the facilities for access of the greatest number to the railroads touching the river, and thus connecting with the eastern and western markets districts otherwise much isolated and hitherto dependent on teaming to railroad stations over long and bad roads."

In the same report, it is stated that there were then seventeen keel boats in the lower division of the river above Hinton and 8 keel boats in the improved stretch of the middle division above Radford. Most of the boats in the lower division were engaged in transporting logs and lumber from mills along the improved portion of the river to Hinton where the railroad touched the river. Some grain, tobacco, etc., was shipped down to Hinton by boat. References in this report to boat traffic on the lower division make no mention of any traffic originating in Virginia or at any point higher up than 24 miles above Hinton. The traffic was clearly local to that stretch immediately above Hinton and entirely within the State of West Virginia. Similarly the eight boats in the middle division were in a traffic local to that section. The railroad shipping point there was at New River Bridge, just above Radford, and the principal traffic was boating pig iron down to this point from several small furnaces located 25 or 30 miles upstream.

The above somewhat detailed description of the local nature of transportation on New River has been thought desirable because of the emphasis which the plaintiff places on the pig iron shipments to New River Bridge, and upon the volume of lumber, etc., delivered by boat to Hinton. Conceding the accuracy of the testimony in this regard, it is clear, I think, that in each instance the traffic was purely intrastate. It occurred in two widely separated stretches of the river, one over a distance of 25 miles or more entirely in Virginia, and the other over approximately the same distance in West Virginia; and between the two was a stretch of about 60 miles over which there was no appreciable commercial traffic, and little of any sort.

151 Throughout the annual reports of the Chief of Engineers during the progress of the work on the river there are repeated statements emphasizing the local nature of the boat traffic and pointing out that facilities do not exist for continuous traffic. And, particularly in the later years, it is reported that the latter condition could be obtained only by the adoption of a more general, more radical, and more expensive plan of permanent improvement than that attempted.

In addition to traffic by keel boats evidence was introduced as to steamboats on New River. This attempt at steam navigation was likewise purely local and notably unsuccessful. Several such boats, more or less improvised, all of shallow draft, were built at Hinton and attempted to navigate the pool water immediately above that point. They seem never to have gone further than about 10 miles above Hinton and then only when the river was above normal stage. At least one boat propelled by a gasoline engine was built at Radford for attempted use on the improved stretch of the river above that point, but never got further from its home port than 6 or 8 miles upstream. This boat was about 50 feet long and 7 or 8 feet wide, with a flat bottom and drawing only 4 or 5 inches of water unloaded; when loaded the draft was about 12 inches. After about a year of sporadic and unprofitable operation around Radford, with various misadventures, the owner decided to take this boat down to Hinton where he had heard that there was a stretch of 8 or 10 miles of still water where conditions for operation were better. Waiting for a rise of 5 or 6 feet in the river, he floated the boat through. The owner's description of the difficulties of that trip strongly deny the availability of the river as an avenue of transportation. No better luck with the venture was had at Hinton and, after a few weeks, the boat was sold for a trivial sum to someone who took it off the river. These attempts represent the history of navigation on New River by boats mechanically propelled. In each instance they were local to short stretches of improved portions of the river and were of short duration. They were merely the manifestations of a spirit of impractical optimism, with perhaps a tinge of curiosity.

152 Whether the purpose of those who originally inspired and promoted the plan of improving New River with Federal funds was to make the river navigable throughout its course is not clear. But it is clear, I think, that the work done had no such purpose, but was confined to improving separated stretches of the river to aid in local transportation to railroad points. After the work started, its scope was modified by making channels of lesser depth and lesser width than mentioned in the original plan; and as the work progressed the engineers in charge emphasized in their reports that no attempt was being made to make possible continuous navigation, and that such a result could be accomplished only by some plan different, and more elaborate than that attempted.

The annual reports of the Chief of Engineers, containing reports made by engineers who were in charge of work on New River, or otherwise familiar with it, are of great value in determining

the character and extent of navigation on the river, and the effect of the improvements made. I quote from some of them.

In the report for 1879, Captain J. W. Cuyler, engineer on the work, stated that, while the project of improving the river was practicable, it was necessary even for bateaux navigation and rafting.

"to adopt a more general and radical method to effect a permanent improvement than has heretofore been tried."

In the report of 1883 it is said:

"The navigation of the river not being continuous as yet, it is practically a feed to the railroads which cross it and run along portions of it"

In 1885 it was reported that, from appropriations for the improvements on New River, there was a balance of $3,000 specially designated for use in the upper or Lead Mines Division above Foster's Falls "which are not passable." That it had not been expended because there was no need for it so long as these falls were impassible, but that when the railroad up Cripple Creek had been completed, boats could touch this railroad above Foster's Falls. And the report for 1886 says:

"Hitherto the obstruction offered to navigation by Foster's Falls, about 6 miles below the mines, almost rendered it useless to expend the money appropriated for the division under consideration. The construction of the Cripple Creek Railroad,
153 however, abrogates this and puts this division on a par with those of Greenbrier and New River Bridge, for its objective point is a railroad as well as that of the other two * * *."

The report of the Chief of Engineers for 1887 contains the following:

"As Congress has never given such a sum of money as would justify the proper beginning of a connected project for a continuous navigation from the North Carolina border to Hinton, the effort has been to apply such funds as were supplied in ameliorating the condition of the river."

And the view is expressed that, because of the unlikelihood of necessary appropriations, "it is supposed that the same policy should continue of partial improvement in connection with the railroads."

In the same report, Colonel Craighill, in charge of the work, says:

"For reasons often mentioned in annual and special reports, no attempt has been made to give a continuous navigation on New River to Hinton * * *."

In 1891, the following appears in the course of a report made by Colonel Craighill to the Chief of Engineers:

"The last directions of Congress have been practically complied with by the expenditure of 75 percent of the last appropriation. The last work done, however, under those directions was a subject of ridicule by the community near its locality because of its evident uselessness, except to put money into the pockets of a few men, and to lead to the probable control of a few votes. The expenditure of the remaining balance almost entirely in the excavation of rock on the limited part of the river to which it is specifically applicable under the law would not accomplish the smallest useful result, and would in my judgment be a shameful waste of public money. It is recommended that it be covered into the Treasury as no longer required for expenditure."

In 1894, citizens of West Virginia, complaining that ore washings deposited in New River at mines in Virginia polluted the water, rendered it unfit for domestic use, destroyed fish and defaced scenery, invoked the aid of the Federal Government to stop the practice. The matter was the subject of sporadic controversy over many years, during which the War Department repeatedly pointed out that the matter was one of local concern justifying no action by the Federal Government. In 1916 the Chief of Engineers addressed a communication to the Secretary of War reviewing this controversy, and the action of his predecessors thereon, and specifically agreeing with their findings. From this the following excerpts are quoted. Of the first complaints made the then Chief of Engineers said:

154 "The interests of navigation are not involved in this matter; the controversy is one purely of local concern." * * *

"These are important matters to the people of West Virginia, and the injury inflicted is doubtless of a serious nature; but it is submitted that the General Government can afford no relief and provide no remedy in the premises. The control of Congress is conferred by the commerce clause of the Constitution of the United States, and is to be exercised for the preservation and protection of navigation and the protection of commerce only. The existing laws were enacted, and are to be executed for this purpose only.

"Congress has passed no statute to protect the fish or the scenery of New River, or the purity of its water, and unquestionably such a statute if passed would be invalid."

The controversy was then dormant for some years, but in 1910 it was renewed by a petition which added to the previous grounds of complaint the allegation that the ore washings caused deposits in the Kanawha River thereby decreasing the navigable depths of the Kanawha and that they otherwise interfered with and obstructed navigation on the Kanawha. After investigation of this renewed complaint, the Chief of Engineers stated in part:

"While this action is desired ostensibly in the interest of navigation on the Kanawha River, it is probable that the real basis of the request is the desire to preserve for the people of the State the use and enjoyment of the waters and scenery of New River."

* * * * * *

"There has been no useful navigation on New River at any time, and none is possible under existing natural conditions, nor without the expenditure of vast and prohibitive sums in improvement-work. While the discharge of ore washings in New River may produce conditions in the Kanawha injurious and obstructive to navigation, in the various ways alleged by petitioners, it is probable that in most instances the effect is too remote, and too much complicated with other causes to warrant the action desired by the petitioners * * *."

These quotations are made at length in controversion of the contention that the Federal Government has, over a long period of years, recognized New River as a navigable stream and asserted its authority over it as such; and to show that throughout this extended controversy the navigability of New River was clearly denied by these officers of long experience and acquaintance with it. Even the complaining citizens made no assertion of the navigability of New River but only that navigation in the admittedly navigable Kanawha was affected.

In 1913 the report of the Chief of Engineers on an examination of New River from Radford to Hinton was transmitted to
155 Congress by the Secretary of War (House Document No. 1410, 62d Congress, 3d Session). After reviewing the character of the stream and the work previously done on it, it is said:

"About $110,000 has been expended on this river in improving the bars by building chutes or sluiceways through them. This afforded possible light-draft navigation and was used to some extent a number of years ago. But little has been done on the river since 1882. There is a very small commerce carried on in the lower part of the reach under consideration by the use of so-called keel boats, which are towed or poled. There being no connection with the river below, the commerce is local."

* * * * * *

"There is very little commerce on this river at present, and as there are no commercial or mining industries of importance, no material increase could be expected even if it were improved. Physical conditions are such that it could not be improved for useful navigation except at prohibitive cost."

On December 29, 1925, the Chief of Engineers made a report to the Federal Power Commission, wherein, after stating his understanding of what constitutes a navigable stream (and his definition is accurate), he says:

"Having this rule in mind, I am of the opinion that the data and information disclosed in the Department's records and reports do not support the conclusion that New River affords a channel for useful commerce or that it is navigable in fact. That section of the river between its mouth and the town of Hinton, having a fall of about 735 feet in a distance of less than 60 miles, may be dismissed from discussion. This Department has reported that the whole section is unfavorable for navigation and could not be connected with navigation in the Kanawha by the expenditure of any reasonable amount."

He then recites that surveys have been made of that portion of the river from Hinton upstream to the mouth of Wilson Creek, a distance of about 190 miles, partly in West Virginia and partly in Virginia; and after reciting the reports that the general characteristics of the river are those of a mountain stream, with alternating pools and rapids and with a rocky bed obstructed by boulders, he says:

"The detailed, mile by mile, data given in the reports fully jus.ify these concrete statements, and it seems unquestionable that the river was not navigable in fact in its original natural condition.

"It is my opinion that these natural conditions were not changed by subsequent improvements, to the extent of making the river a highway for commerce."

After reciting those improvements and their local nature, he says:

"It is evident that the work executed by the Government during the years 1877–1882 did not materially change the natural non-
navigable conditions of the river. The improvement ef-
156 fected was at most slight and fragmentary, and the small channels worked over are reported to have deteriorated due to the natural action of ice and the current. Continuous navigation on the river has never been possible, and whatever commerce has existed has been altogether local, apparently confined to the 25 mile section in West Virginia, ending at Hinton."

I have chosen to quote at length from the contents of these various official reports because of the weight which I consider they should have on the issue here involved. They were made by responsible officers of the War Department in the course of their official duties and under conditions involving no thought of litigation or controversy. The facts recited are based upon actual knowledge of the river gained by surveying it, observing it, and directing the work upon it. So far as their statements may be said to be expressions of opinion, their source gives value to the opinion, for they are given by men scientifically trained and experienced and one of whose larger duties is in dealing with the

navigable waters of the country; men who are acquainted with comparable streams and who know of the requirements for commercial navigation and the engineering problems necessary to establish it where it does not naturally exist.

Official findings and corresponding action on the part of the War Department are significant on the question of navigability. United States v. Oregon, 295 U. S., at p. 23.

Finally, it may be said that, in response to the declaration of intention filed before it with respect to the project now in question, the Federal Power Commission made a finding on June 1, 1927, that:

"Said river in the part thereof involved in said declaration is not 'navigable waters' within the definition thereof in said Act." (Referring to the Water Power Act.)

It is clear that the question of navigability is one of fact which must be determined by the Court upon all the evidence and that this duty cannot be abdicated; nor is it performed by mere acceptance of the findings or opinions of other persons no matter how competent. But the determination of the issue of navigability permits a wide range of testimony and coming permissibly within this range, I think, are the opinions of persons who by training and experience are competent to speak. So far as the official reports from which quotation has been made express opin-
157 ions on the navigability of the river, they are accepted merely as the opinions to be considered with the other evidence and given such weight as they may be deemed entitled to. With the same thought in mind, the Court permitted witnesses to testify at the trial, giving their opinions on the issue of navigability.

In past times various dams and bridges have been constructed in or across New River and in some instances persons contemplating such constructions sought permission or approval therefor from Congress or the War Department. I find no instance where this was refused when sought. This appears to have been done merely as a matter of precaution on the part of those sponsoring these projects, and to clothe them with a supposed authority for what it might be worth. As tending to show recognition of Federal control over the stream, this evidence loses any value due to the fact that in a like number of instances dams and bridges have been constructed without seeking the permission of Federal authority. And where this was done I find no instance where the Federal Government has sought to interfere with or prevent it. In other words, if permission was sought, it was granted; if permission was not asked, no question was raised.

I find also the following facts, pertinent to this and other phases of the case. That there is at present no commerce or navi-

gation on New River or, if any, it is entirely local and in a trivial and unnoticeable amount. That the Federal Government has made no improvements on the river since those heretofore discussed and that it does not have in contemplation any improvements affecting the navigable condition of the river. That it does have in contemplation certain projects for flood control, including the erection at a point a few miles above Hinton of what is referred to as the Bluestone Dam, the proposed purpose of which is to impound the waters of New River and control their flow in times of flood and in the aid of navigation upon the Kanawha.

The Law as to Navigability

The cases which have arisen in this country involving the navigability of water courses are myriad in number. And, apparently, industrious counsel have cited all of them. Except as the
158 decided cases have laid down general principles and have made clear the limitations upon them, it is rarely that one case can be greatly helpful upon the issue of navigability in any other case. Navigability is a question of fact, to be determined by the facts shown in each case.

No power of control over navigable waters is specifically granted to the United States by the Constitution. In cases where it exists, it derives from the power in the Federal Government "to regulate commerce with foreign nations, and among the several states * * *." This power to regulate commerce being limited to that which is foreign or interstate, it follows that the boundary of Federal control over navigable waters is the regulation and protection of commerce of a similar nature.

What is probably the most frequently quoted and the most acceptable definition of navigable waters is that laid down in the case of The Daniel Ball, 10 Wallace 557:

"Those rivers must be regarded as public navigable rivers in law which are navigable in fact. And they are navigable in fact when they are used, or are susceptible of being used, in their ordinary condition, as highways for commerce, over which trade and travel are or may be conducted in the customary modes of trade and travel on water. And they constitute navigable waters of the United States within the meaning of the acts of Congress, in contradistinction from the navigable waters of the states, when they form in their ordinary condition by themselves, or by uniting with other waters, a continued highway over which commerce is or may be carried on with other states or foreign countries in the customary modes in which such commerce is conducted by water."

The rule stated in The Daniel Ball has frequently been repeated and approved down to the present time. United States v.

Rio Grande D. & I. Co., 174 U. S. 690; Leovy v. United States, 177 U. S. 621; Brewer-Elliott Oil & Gas Co. v. United States, 260 U. S. 77; United States v. Holt State Bank, 270 U. S. 49; United States v. Utah, 283 U. S. 64; United States v. Oregon, 295 U. S. 1; and others.

Obviously navigable waterways may lie entirely within the borders of a state and the navigation upon them be entirely intrastate; or they may extend across state lines and be the avenues of commerce betwen the states. The test of whether the waterway is navigable is the same in each case; but the source of governmental control, is vastly different. As clearly indicated in The Daniel Ball, a navigable river is one which meets certain
159 conditions as a highway for commerce; a navigable water of the United States is one which, fulfilling the same conditions, is a highway for commerce between the states. It is of the latter only that the Federal Government has plenary control, and this authority flows from its power to regulate commerce between the states.

The rule defining navigability above quoted from The Daniel Ball has never been essentially modified. Later cases have taken occasion to explain or clarify or interpret the language used, but not to alter it. In The Montello, 20 Wallace 430, the rule of The Daniel Ball is quoted, approved and applied, but it is made clear that the true criterion of navigability is the capability of use by the public for purposes of transportation and commerce, rather than the extent and manner of that use; that capability for use by steamboats and sailing vessels is not required, but only that the stream should be capable of being used for commerce in any mode that commerce may be conducted. At the same time, it is pointed out that navigability is not imparted by the ability to float small boats such as skiffs or canoes, but that it must be generally and commonly useful for purposes of trade.

In Leovy v. United States, 177 U. S. 621, the definition of the term "navigable waters" given in The Daniel Ball is again quoted, as well as the language used in The Montello, and the Court says:

"It is a safe inference from these and other cases that the term 'Navigable Waters of the United States' has reference to commerce of a substantial and permanent character to be conducted thereon."

The Court further condemned an instruction given by the trial court that implied that navigability was created by the ability to float any boat; saying that the mere capacity to pass skiffs and small luggers from one state to another did not render a stream a navigable water of the United States and, if it were so held, there would be scarcely a creek or stream in the entire country not included in the term. I do not take this decision to modify

the holding in the case of The Montello, but on the contrary to confirm it. Nor do I understand either of the cases to alter the holding in the case of The Daniel Ball, but only to interpret it. There is no need to review the many cases in which the rule has been restated. As late as United States v. Oregon, 259 U. S.
160 1, we find it repeated that the test of navigability is whether the body of water in question, in its natural and ordinary condition, is susceptible for navigation in the customary modes of trade and travel over water and has capacity for general and common usefulness for trade and commerce. It follows that in order to constitute it "navigable waters of the United States" the trade and commerce referred to must be of an interstate or foreign character.

The plaintiff stresses those cases in which it has been held that it is not necessary that the condition of the stream should be such as to permit the passage of boats at all portions of the stream and that occasional interruption or retardation of navigation by falls, rapids, or other unfavorable conditions does not necessarily render the river nonnavigable. There are cited such cases as The Montello (supra); St. Anthony Falls, etc. v. St. Paul Water Commissioners, 168 U. S. 349; Economy Light & Power Co. v. United States, 256 U. S. 113. There can be no question about this general proposition nor about its applicability in these instances where the general test of navigability is met. And all the cited cases hold is that occasional interruptions or difficulties to navigation from rapids, bars, or other conditions do not render a stream nonnavigable where it appears that in fact it is used or is susceptible of use for navigation in spite of such difficulties. For example, in the case of The Montello, involving the Fox River, Mr. Justice Davis, referring to obstructions in the river, says:

"This is true and these obstructions rendered the navigation difficult * * *. But with these difficulties in the way commerce was successfully carried on, for it is in proof that the products of other states and countries were taken up the river in its natural state * * *."

Much also has been said about the susceptibility of developing New River as a navigable waterway through artificial aids to navigation and it is argued that a stream may still be classed as navigable even though it is found necessary or desirable to alter the natural condition of the river by means of dams, canals, or other structures at points throughout its course. Ashwander v. Tennessee Valley Authority, 297 U. S. 288, is cited. There is no need to discuss the cases in which such a question has arisen; nor to define the limits within which necessary artificial aids to
161 navigation measure the navigability or nonnavigability of a stream. See Brewer Elliott Oil & Gas Co. v. United States, 270 Fed. at p. 103. It is obvious that there are limits. Otherwise

every stream with any considerable flow of water would be classed as navigable. The practically unlimited skill and resourcefulness of the engineering profession can, by the use of dredging and the building of dams, locks, canals, etc., turn any stream into an avenue of transportation providing someone is willing to pay for it. Narrow, steep, and rocky mountain streams which are rushing torrents in winter and spring and in times of great rainfall, but which for most of the year are completely dry, could be made navigable by enlarging the stream bed and building dams in sufficient size and number to impound water in pools. But by no stretch of the imagination could such streams, in their natural condition, be termed navigable or reasonably susceptible of navigation.

In 1874 General Barnard, reporting to the Chief of Engineers on the practicability of establishing navigation on the New River from Hinton to its mouth, as part of a route for transportation by water between the Atlantic seaboard and the trans-Allegheny states, stated that this could be done only by a "pure lock and dam" system whereby boats would transfer "directly from pool to pool," and that in this stretch of the river alone 60 dams would be required. He further states that, "as an engineer * * * I cannot * * * affirm its practicability, though I have no doubt that, so far as mere construction is concerned, it is so." He reported further that it would be more practicable to build "an independent canal" for this part of the route. I have already quoted a report of the Chief of Engineers in 1910 stating that no useful navigation is possible on New River without the expenditure of "vast and prohibitive sums." The Ashwander case has no application to such a situation as is depicted here and where all thought of making the stream navigable has been abandoned when investigation showed its impracticability.

As stated by Mr. Justice Pitney in United States v. Cress, 243 U. S. at p. 321, "it has become well established that the test of navigability in fact is to be applied to the stream in its natural condition, not as artificially raised by dams or similar struc-
162 tures." Even more certainly is this true where the dams or similar structures necessary to creat navigability have never been built, are not contemplated, and have been found impracticable.

The plaintiff relies upon the fact that the Federal Government has made expenditures for the improvement of New River as establishing and recognizing its navigability, and in its brief it is said:

"The Government maintains that Congress once having spent money to improve navigation on a river has never abandoned the part so improved except by direct affirmative legislation in which it specifically abandons that part of the river as being nonnavigable."

The fault in this argument is obvious. Navigability is a matter of fact and if a river is not in fact navigable it cannot be given that status by legislative declaration; United States v. Cress, 243 U. S. at p. 322; much less by the mere appropriation of money to be used to determine whether it can be made navigable. Congress, under importunities from various sources, has made appropriations for expenditures on a great variety of water courses in the country in past years and for various purposes. To say that the expenditure of such funds, ipso facto, invested each and all of these water courses with the status of navigable waters is beyond reason and fact. Indeed, a substantial part of such expenditures have been made in vain attempts to create navigability in streams not navigable and found to be impracticable of being made so. As was said of a like situation in United States v. Brewer-Elliott Oil & Gas Co., 249 Fed. at p. 618, in relation to Federal appropriations for improvements on the Arkansas River:

"Such acts should be assigned weight, in view of the power of legislative inquiry and judgment. But their force is not to declare a river navigable in its natural state * * * and none of these acts purport to do so. A project for river improvement may be to create navigibility, or, however prudently formed, may be necessarily experimental, and result in practical abandonment at a given section. * * * While the acts are proper for consideration, they are in any event inconclusive, and leave the fact of actual navigability quite open to proof."

Agreeing that consideration should be given to this fact of Federal expenditures upon New River, I think it not illogical to give consideration also to the fact that after small local expenditures had been made all effort at further improvement was abandoned and that the Chief of Engineers expressed it as his opinion that the improvements made had "not materially changed the natural nonnavigable condition of the river" and ad-
163 vised against further attempts at improvement.

The volume of the evidence introduced before the court has permitted discussion of only the most pertinent features of it and then only in general terms. From a consideration of all of it, the conclusion is reached that New River is not and never has been navigable, either in its natural condition or after the improvements made, except in certain short and isolated stretches to each of which the navigation was local and confined within the limits of a single state; and that it has never been used, and has never been susceptible of use, as an avenue of interstate or foreign commerce. It is, therefore, found that defendant's project is not situated upon a navigable water of the United States.

THE EFFECT OF DEFENDANT'S PROJECT UPON NAVIGATION IN THE KANAWHA RIVER

In 1802 the State of Virginia, by an act of its General Assembly, reserved to the state ownership of the beds of rivers and creeks in the western part of the state, by the following terms:

"Whereas, it hath been represented to this present General Assembly that many persons have located, and lay claim in consequence of such location, to the banks, shores and beds of the rivers and creeks in the western parts of this Commonwealth, which were intended and ought to remain as a common to all the good people thereof: Be it therefore enacted, that no grant issued by the register of the land office for the same, either in consequence of any survey already made, or which shall hereafter be made, shall be valid or effectual in law to pass any estate or interest therein."

The broad language of this act might well inspire a question as to what were the limits of the "western parts" of the state. But there seems no question that New River was considered as being in this indefinite territory and the act was applied to it, with the result that riparian owners along this river hold title only so far as the bank of the stream and ownership of the bed is recognized as being in the state.

The plaintiff has cited this act as a recognition of the navigability of New River. But the language of the statute discloses no such intent. That portion of the state was then largely unsettled and the state was the proprietary owner of great
164 areas of land of which it was, from time to time, making grants to individuals. That it should see fit to reserve the beds of streams, in order that they should remain under ownership of the Commonwealth to be controlled for the public good, was not unusual. But the power to do so was not dependent on the navigability of the stream. The power was that of any owner to grant what he chose and keep what he chose.

It would seem plain that the state, holding ownership and control of this river for the benefit of its citizens, has the right to make such use of it as it may see fit, subject to any paramount rights of the United States. See United States vs. Rio Grande Irrigation Co., 174 U. S. at p. 703. One of these paramount rights is that which the United States may have as a riparian owner; the other is the right to protect the navigability of navigable waters of the United States. The first is not involved here, for no property of the United States is affected by defendant's project. It is upon the second named limitation upon the power of the state that the plaintiff relies. It is contended that, irrespective of whether New River is navigable, the erection of de-

fendant's dam should be enjoined for the reason that the erection and operation of the project will impair the navigable capacity of the Kanawha and Ohio rivers.

This likewise involves an issue of fact to be determined by evidence.

"The question always is one of fact, whether such appropriation substantially interferes with the navigable capacity within the limits where navigation is a recognized fact." United States v. Rio Grande, etc., Supra, at p. 709.

On this issue, as on that of navigability, the evidence is voluminous, and permits of no detailed description beyond reference to pertinent established facts, and to the substance of the evidence in its more important features.

The project for which the defendant has obtained a license from the State of Virginia involves a dam with an over-all height of approximately 130 feet, creating a reservoir with a maximum utilizable storage capacity of 100,000 acre feet, and with a power installation which when operated at maximum capacity will utilize about 9,000 cubic feet of water per second.

In the course of its improvements on the Kanawha River the Federal Government has erected a number of dams across
165 that stream which, to use an engineering term, will completely "canalize" that river; meaning thereby that the Kanawha will consist of a succession of adjacent pools created by these successive dams. The uppermost of these dams on the Kanawha is known as the London dam, which is about 12 miles below Kanawha Falls; and the London pool extends up to about 4 miles below Kanawha Falls. About 15 miles below the London dam is the Marmet dam. About 37 miles below Marmet is the Wingfield dam, which is about 30 miles up from the point where the Kanawha empties into the Ohio. There is also being constructed a dam at Gallipolis, Ohio, on the Ohio River below the mouth of the Kanawha, and the pool of the Gallipolis dam will extend up to Wingfield. The primary purpose of all these dams on the Kanawha is for the improvement of navigation by the creation of navigable pools, and they are equipped with locks for the transfer of boats through the dams. However, each of them have installations for the production of electric power in large volume. The power facilities are operated by private interests under lease from the Government. London, the uppermost of these dams, is approximately 170 miles below the site of defendant's project.

The alleged interference with navigation on the Kanawha from defendant's project is based upon the operation of that project after completion. Obviously the mere erection of defendant's dam would not affect the navigable capacity of the Kanawha.

Water, in the volume supplied by nature, would run through New River just the same, with the difference that it would run over the top of defendant's dam at that point instead of in the stream bed. It is in the alleged manner in which that flow would be transmitted to the Kanawha through the operation of defendant's power plant that the plaintiff asserts navigation on the latter stream would be impaired.

The principal contention is that the operation of the plant will create an irregularity of flow in the river, involving periods when there will be little or no water released at plaintiff's dam, followed by periods when water will be turned loose in large volume; that these irregularities will create alternating rises and falls in the pools on the Kanawha, and would cause oscillations in the pools, all of which would hamper and ob-
166 struct navigation in these pools. There is also the contention that the flow at Radford might be cut off at low water seasons, depriving the Kanawha of its normal supply of water. And a further contention that defendant's project would interfere with the operation of the flood control and power dam which the Federal Government proposes to build at Bluestone.

As to the first of these, it is urged that the periodical discharges of large volumes of water in the operation of the defendant's plant will create tides or waves in the river below, which will be transmitted through its course and into the Kanawha creating rises and falls in the pool levels and oscillation of the water in them. A vast amount of evidence was introduced as to the behavior and effect of these tides or so-called "power waves," including charts, graphs, and diagrams of all sorts. It was in large measure theoretical, representing the estimates and opinions of witnesses on assumed methods of operating defendant's power plant. The evidence was sharply contradictory and, in many respects, uncertain and confusing. From the plaintiff's standpoint, it was evident that the testimony throughout was based upon the assumption of conditions which offered the greatest degree of possibility of the results which they assertedly feared. In other words, witnesses testified as to what might happen under certain conditions, but without regard to whether such conditions were likely to occur. Apparently witnesses for the plaintiff based their testimony on the assumption that the defendant's plant would be operated at all times as a peak-load carrier and at its maximum hydraulic capacity. That it would operate for 12 or 15 hours with a discharge of 9,000 cubic feet per second, and for the remainder of the twenty-four hours there would be no discharge; and that power waves of great volume would be caused by this operation, with the resultant harmful effect on navigation in the Kanawha, 170 miles below.

The evidence of the defendant was that there was no basis for the assumed conditions pictured by plaintiff's witnesses. That the defendant had no intention of operating the plant in any such method and that the water supply of the stream made it impossible; and that even were it possible it was an economically impracticable and unsound method of operation. I think the
167 evidence fully sustains this latter proposition and, in fact, I do not understand plaintiff's witnesses to claim the method of operation assumed by them to be one which they themselves would approve or adopt. The defendant, however, insists that even if the project were operated in the manner assumed by plaintiff's witnesses, there would be no such results in the Kanawha as is claimed, and no interference with navigation there. I think also that the evidence supports this contention. In support of it there is offered evidence of tests made in the year 1930 to determine the nature and effect of power waves. At that time engineers of the defendant, in cooperation with engineers of the Federal Government, conducted tests with waves created at the Byllesby dam, a plant situated about 48 or 50 miles upstream from the proposed Radford dam. Waves of varying magnitude were created and the results on the rivers below, including the Kanawha, were observed. Discharges of a maximum of 14,000 feet per second were obtained with an average of probably 8,000 second-feet. Apparently the effect of these waves in the Kanawha was negligible. The flattening out of the waves in the passage of the water through New River caused it to enter the Kanawha in such manner as that the rise in that river was so gradual as not to be observable to the eye. The testimony of defendant's engineer who participated in the tests was that they had no effect on the navigable capacity of the Kanawha. The Government engineers who participated in these tests were not made available as witnesses by the plaintiff, but it was admitted that, if present, they would testify to the same effect. While these power waves originated some 48 or 50 miles higher upstream than the site of defendant's project, and proper allowance must be made for this fact, nevertheless the result of these tests strongly negative the testimony of plaintiff's witnesses. Further denial of the plaintiff's contentions as to the effect of the so-called power waves was furnished by the testimony of a number of witnesses, engineers of learning and experience, who gave it as their opinion that the operation of defendant's project could have no such effect as asserted by the plaintiff. In this respect, it is the Court's opinion that the evidence submitted by defendant far outweighed that of the plaintiff's witnesses. In explanation of this statement, I think it necessary to say that the witnesses who furnished
168 the bulk of plaintiff's testimony on the subject of power

waves displayed a bias, an evasiveness and an unwillingness to admit even obvious facts hostile to their contentions, to such an extent as to deprive their testimony of much value.

I think it deserves comment here that it appears in the evidence that at the London, Marmet, and Winfield dams, built by the United States Government for the improvement of navigation in the Kanawha, the power plants at each of these dams have substantially the same maximum hydraulic capacity as defendant's proposed project, namely, 9,000 cubic feet per second. The discharge from these power plants empties directly into the navigation pools. It is not to be presumed that the Government, having built these dams for the improvement of navigation, would at the same time have installed power plants, the operation of which would destroy navigation. And if the navigable capacity of these pools is not impaired by the discharge of waves directly into them from the operation of these plants, it is difficult to see how it could be harmed by waves emanating from a plant of similar capacity located 170 miles upstream. Nor does plaintiff's evidence take into consideration the dam recently erected and in operation at Hawk's Nest, about 6 miles above the mouth of New River, the reservoir of which would have a marked effect on the dampening of any power waves originating above it.

The contention of possible harm to navigation on the Kanawha from a cutting off of the stream flow by defendant's project at low water season needs only brief comment. It is a mere suggestion of what possibly could be done with a dam if the defendant were to operate in complete disregard of its own interest. The suggestion is that defendant might empty its reservoir in periods of low water and shut down for the purpose of refilling it. The evidence is that such a happening is beyond reason and that under no reasonable or accepted method of operation could such a thing happen, and the plaintiff admits that such operation would be contrary to accepted and proper practice. The Court cannot base an injunction on such speculative and improbable grounds as this.

Considerable evidence was heard on the alleged effect of defendant's project on the operation of the proposed, but as yet unbuilt, Bluestone dam. This dam is planned to be erected
169 across New River at a point 3 or 4 miles above Hinton, in West Virginia. Plans for the dam have been prepared, its construction has been authorized and proceedings to acquire the necessary lands along the river have been instituted. There is every probability that the dam will be built and the evidence was on this assumption. The project is allegedly for purposes of flood control and in the interests of navigation on the Kanawha and Ohio rivers and is one of magnitude. The dam is to be approximately 150 feet high. The dead storage will rise about 66 feet;

above this will be 49 feet of usable draft storage; and 35 feet above this will be reserved for freshets and flood control. The utilizable storage will be 245,200 acre-feet, about 2½ times the like storage of the defendant's project at Radford, and the storage capacity reserved for floods will be more than 2½ the utilizable storage of the Radford dam. It is planned to install at the Bluestone dam a power plant with a maximum hydraulic capacity of 10,000 or 11,000 cubic feet per second. It will thus be seen that the project at Bluestone is much larger in all respects, and particularly in the important matter of storage capacity, than defendant's project. Speaking generally, the purpose of the Bluestone dam is to impound the waters of New River in a great reservoir from which the flow can be regulated and can also be used in the production of electric power. Under normal conditions, the dam will impound 356,800 acre-feet of water, of which about 112,000 acre-feet will be dead storage and about 245,000 acre-feet will be utilizable storage. This will be used for producing electric power and also to furnish sufficient water for navigation on the Kanawha by releasing it for that purpose, it being proposed that a minimum regulated flow of 2,000 feet per second will be furnished for navigation. The upper 35 feet of the dam, with a storage capacity of approximately 268,000 acre-feet, will normally hold no storage but will be reserved to catch and hold the water arising from freshets and floods and release it more gradually into the stream below.

The plaintiff is not at all clear in its contention as to how the Bluestone project can be adversely affected by defendant's dam at Radford. The evidence on this subject, entirely theoretical, is vague, contradictory, unreasonable, and unconvincing. It is not seen how defendant's project could have the slightest harmful effect on the operation of the Bluestone project. On the other hand, if the Bluestone dam is to be built as plaintiff insists, and as appears probable, this fact removes all possibility of the alleged disturbance of the Kanawha by power waves from the Radford dam, even if there were otherwise any danger from this standpoint. It is obvious even to the lay mind that any waves created by discharge from the defendant's plant will be absorbed and lost in the vast reservoir of the Bluestone dam. The entire discharge of water from defendant's project operating at maximum capacity without interruption for two weeks would not fill the reserve storage of the Bluestone dam, even if no water whatever were passed through the latter during that time. The entire utilizable storage capacity of defendant's dam could be twice emptied into the Bluestone reservoir and still leave 68,000 acre-feet of the latter's reserve storage capacity unfilled. In the face of these facts, the assertion of plaintiff's witnesses that power

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waves from Radford would pass through Bluestone and on down to the Kanawha cannot be given serious consideration.

I am unable to find anything in the evidence that indicates a probability that the operation of defendant's project will impair the navigable capacity of the Kanawha or any other navigable water. The only suggestion to which serious consideration could be given is the matter of the power waves heretofore discussed. If the Bluestone dam is built as planned the possibility of harm from this source disappears. And it seems reasonably certain that a dam will be built at Bluestone—if not by the Government, then by the defendant itself. But even if no dam is ever built there, I think the evidence shows that navigation on the Kanawha will not be impaired or hampered in any way by power waves or any other causes due to the operation of defendant's plant at Radford.

The plaintiff has raised further question, and has argued, that the building of defendant's dam will interfere with a general and comprehensive plan of the Federal Government to regulate the flow of New River for the control of floods and the prevention of soil erosion. These questions need only brief comment. In the first place, it seems clear that the power of the National Government is limited to the protection of such interest as it has
171 the constitutional duty and power to protect. There is no provision of the Constitution giving the United States plenary control over all streams for the sole purpose of controlling floods or preventing erosion of the soil, and none from which such power can be inferred. In the second place, the plaintiff rests on a mere assertion of an interference with its plans. Such evidence as there is leads to a contrary conclusion, namely, that the defendant's dam will be helpful in these respects. New River is a stream of steep and irregular gradient, with a flow of high velocity and varying volume. In any such stream, it may be said, generally speaking, that the erection of any dam which impounds the flow of the stream with means for controlling its release, is a helpful factor in overcoming the effects of flood waters. There is no evidence that plaintiff's dam will have other than this usual effect. On the other hand, there is every reason to think it will be helpful.

Since New River, as the Court has hereinbefore found, is not itself a navigable water of the United States, it is evident that any valid objection to the erection of defendant's project must rest upon the right of the United States to protect the navigable capacity of the Kanawha (a navigable water of the United States) and, as a means to such protection, to prevent any obstruction in New River which would impair the navigable capacity of the Kanawha. The applicable statute is the Act of March 3, 1899, known as the Rivers and Harbors Act; 30 Stat. 1151. It now appears in Title 33 U. S. C. Secs. 401 et seq. The act provides

(Sec. 10), 33 U. S. C. 403, that "The creation of any obstruction, not affirmatively authorized by Congress, to the navigable capacity of any of the waters of the United States is hereby prohibited * * *." This act superseded the Rivers and Harbors Act of September 19, 1890, 26 Stat. 454, Sec. 10, which was under discussion in United States v. Rio Grande Irrigation Co., 174 U. S. at p. 707.

The language of the two statutes is substantially the same in effect so far as it relates to the act to be prohibited. There is this difference, however, in their provisions as to remedies. The former act provided that proceedings might be instituted by the Attorney General of the United States to prevent by injunction the creating or continuing of any such obstruction
172 and to cause the same to be removed, where the obstruction was threatened or existed. This was the act before the court in the Rio Grande case, supra. The present act provides that injunction may be used to enforce the removal of any obstructing structure erected "in any district where the same may exist." A surface construction of the language of the respective statutes indicates that it was the purpose of Congress, in the present act, not to authorize proceedings by way of injunction against the creation of obstructions or those which were merely threatened, but to authorize such remedy only where the structure had been erected and it had been found that an obstruction existed. This in itself might raise question as to the right of the plaintiff to ask for injunction in this case, where erection of the dam has merely been started. However, the question is not of importance here. Even if it be conceded that the plaintiff under the general principles of equity jurisdiction has a right to seek injunction against a threatened danger, it is apparent that such relief is dependent upon a reasonable showing that the proposed structure will have the harmful effect attributed to it. No such showing has been made here. The most that has been shown is a theoretical possibility of interference with navigation in the Kanawha based upon the supposition that defendant's plant would be operated in a manner which is impractical, not economically sound, and not in accordance with established and approved practice. And it is denied by the much greater weight of evidence that any harm could result even from the theoretical and improbable conditions pictured by the plaintiff. Stated briefly, the plaintiff has shown no probability of harm, but only a theoretical possibility; and even this possibility is denied by the evidence.

In United States v. Rio Grande, etc., Supra, it is said, speaking of the prayer for injunctive relief:

"Of course, when such proceedings are instituted it becomes a question of fact whether the act sought to be enjoined is one which

fairly and directly tends to obstruct (that is, interfere with or diminish) the navigable capacity of a stream. It does not follow that the courts would be justified in sustaining any proceeding by the Attorney General to restrain any appropriation of the upper waters of a navigable stream. The question always is one of fact, whether such appropriation substantially interferes with the navigable capacity within the limits where navigation is a recognized fact."

173 As intimated in the quotation above, the fact that the plaintiff is the United States Government does not alter the legal principles applicable. The Federal Government, as other plaintiffs, is entitled to relief only when its rights are invaded and this invasion must be established not by mere assertion but by proof. The mere averment that rights of the United States are endangered is not sufficient. If it were, then the National Government might, by that mere averment, prevent citizens from making legitimate use of their property and strip the states of all control of any streams within their borders. It is to be remembered that not only does the defendant here have extensive property rights which it seeks to utilize in its business and which are of little or no value to it except as so utilized, but the State of Virginia has important interests involved in its right to develop its natural resources in the interest of its citizens. The Virginia statute, entitled for the "Conservation and Development of Water Courses and Water Resources," Va. Code, Chap. 139A, Secs. 3581 (1) et. seq. provides:

"In order to conserve and utilize the otherwise wasted energy from the water powers in this state, it is hereby declared to be the policy of the state to encourage the utilization of the water resources in the state to the greatest practicable extent and to control the waters of the state, as herein defined, and also the construction or reconstruction of a dam in any rivers or streams within the state for the generation of hydro-electric energy for use or sale in public service, all as hereinafter provided."

The statute then defines what shall constitute "waters of the state," this including streams which by legislative enactment had theretofore been declared to be navigable, streams used or suitable for use in interstate commerce, and streams "the bed of which is owned by the Commonwealth." It is provided that no dam shall be erected in any "water of the state" except upon application to the State Corporation Commission and after the granting of a license therefor by said Commission, after hearing, and finding that the public interest will be promoted thereby or not detrimentally affected.

Pursuant to this statute the defendant made application to the State Corporation Commission for a license, submitting its plans

and other pertinent data and, after an extended hearing, the Commission, on October 25, 1932, issued a license reciting that "the general public interest will be promoted by the consummation of the proposed development," and in which it set forth
174 the terms and conditions upon which the project should be built and operated.

It is conceded that the right of the state to provide for the development of its water powers must be exercised in submission to the paramount interests of the United States to protect its navigable waters. But to deprive the state of its rights in this respect it is necessary that there should exist facts which create a reasonable belief that the interests of the National Government will be interfered with. A mere averment of such interference, or a nebulous and remote possibility, is not sufficient. In this case there is no such showing of any existing or potential interference with navigation on the Kanawha as would justify a court in issuing an injunction which would deprive the defendant of the use of its property and tie the hands of the state in the development of its natural resources. And particularly is this true when it is borne in mind that the plaintiff is not foreclosed from compelling removal of the dam if in the future it should at any time prove a detriment to navigation in the Kanawha.

THE FEDERAL WATER POWER ACT AND ITS BEARING UPON THE RIGHTS OF THE PARTIES

What has been said heretofore may be said to be based upon general principles of law which have received the sanction and approval of the courts of this country over a long period of time. However, the facts stated must be examined in the light of the provisions of the Act of Congress enacted June 10, 1920, 41 Stat. 1063, under the title of the Federal Water Power Act and later, on August 26, 1935, re-enacted with some amendment under the title Federal Power Act (49 Stat. 863) and now appearing as Sec. 791a et seq. of Title 16 U. S. C., and which plaintiff invokes as determinative of the rights which it has asserted.

History of Proceedings Before Power Commission

Before entering upon any discussion of the applicability of the Federal Power Act, it seems desirable to state the history of the proceedings before the Federal Power Commission in relation to defendant's project. In June 1925, the New River Development Company, predecessor of defendant, filed with the Federal Power Commission a declaration of intention to construct the project at Radford. This declaration of intention was, in September

175 1926, assigned to the defendant, which continued the presentation of the declaration on the same plans. This declaration of intention was filed, so defendant asserts, for the purpose of obtaining from the Commission a declaration that, since New River was not navigable, there is no jurisdiction over the project under the Federal Water Power Act.

It is difficult to ascertain the extent of such investigation as was made by the Power Commission as a basis for a finding as to the effect of defendant's project, as prescribed by Sec. 23 of the Power Act; but it appears that a request was made of the Chief of Engineers for information upon the stream and upon the effect of the proposed project. Under date of August 20, 1925, General Taylor, Chief of Engineers, made a report to the Commission, giving a general description of New River and of the expenditures made on it in 1876–1882, but his statements as to the effect of defendant's project upon navigation in the Kanawha were quite indefinite. He states in substance that any possible adverse effect was not such as to warrant refusal to allow the proposed construction, if control of it were maintained by the United States, and that proper regulation of the flow would be of benefit to navigation. He made a general recommendation that any license granted should subject the operation of the plant to such regulations as the Secretary of War might prescribe. It is clear from this report that General Taylor assumed that because Federal expenditures had at one time made on the river, the Federal Government had jurisdiction over it. He ends by saying that "no sufficient reason is seen why the Federal Power Commission should not exercise jurisdiction over the proposed project."

Because of the lack of definiteness in this report, the Chief of Engineers was requested by the Power Commission, at the instance of counsel for defendant, to render a further report dealing specifically with (1) the navagability of New River and (2) the effect of the proposed project on the navigable capacity of the Kanawha River. Under date of December 29, 1925, such further report was made, reciting that a careful study had been made of all available data pertaining to the river. The physical features of the river throughout its course are described and, after recognizing the error involved in assuming a status of navigability because
176 of the one-time expenditure of Federal funds in attempted improvements, the report states the conclusion that the river was not navigable in fact in its original natural condition, that the improvements made did not suffice to make it navigable, and that it is not now a navigable water of the United States.

He reports further that, in his opinion, the proposed project would not and could not interfere with the navigable capacity of the Kanawha. He says that under normal operation of the proj-

ect, the fluctuations in the stream flow "would be so attenuated by the time they reached the Kanawha, 155 miles distant, as to preclude the probability of any adverse effect upon navigation on that river." He states that even assuming the possibility that the plant at Radford might be shut down indefinitely in a period of low water, the run-off from the drainage area below Radford would supply sufficient water for navigation on the Kanawha. He says that so far as can be predicted from available data "it would not be possible to operate the proposed project so as to adversely affect navigation on the Kanawha River."

"I, therefore, report that in my opinion, New River in its present condition is not a navigable stream and that navigation on the Kanawha will not be adversely affected by the proposed power development."

On March 2, 1926, the Power Commission had a hearing on defendant's declaration of intention. The record of this hearing shows that the only evidence before the Commission was the report of the Chief of Engineers of December 29, 1925. No other evidence was offered or referred to. There were present counsel for the defendant, the Attorney General of Virginia, and counsel for the State Corporation Commission of Virginia, all of whom urged the Commission to act upon General Taylor's report and leave the defendant free to proceed with its project under the regulation of the State of Virginia. The defendant offered to produce further evidence to support the finding of the Chief of Engineers, if the Commission should desire to hear it. No action was taken at this hearing. The records of the Commission do not show that any further hearing was had or any other evidence taken—at least none of which the defendant was informed or that was made a matter of record. Nevertheless, after considerable delay, the Commission made a finding on June 1, 1927, that the New River was

177 not a navigable stream within the meaning of the Power Act, but that the interests of interstate and foreign commerce would be affected by the construction of the project.

It would be needless and tiresome to recount all the details of what transpired between the defendant and the Power Commission during the several succeeding years. Pertinent facts only need be stated. Following the finding of the Commission of June 1, 1927, the defendant indicated its willingness to accept from the Power Commission a license containing conditions for the protection of navigation on the Kanawha. The Commission, however, indicated that any license issued must be what is referred to as a standard form license, containing numerous conditions, some of which were pertinent to the protection of navigation and many of which were not. Among the conditions of the standard form license were those which provided for supervision

by the Power Commission of the defendant's financing and accounting methods in connection with the construction and operation of the plant; provided that the licensee should establish amortization reserves out of any surplus earned; fixed the amount of such reserves and, in effect, authorized the Commission to determine the fair earnings on the plant. Among other conditions were those prohibiting any lease of the property without prior approval of the Commission and giving the United States the right to take over the project at the expiration of the license period. To these conditions and others having no relation to the protection of navigation the defendant objected and asked that they be eliminated as not within the power of the Commission to impose. The defendant requested issuance of what is termed a minor part license (under Sec. 10 (i) of the Power Act), limiting its conditions to those necessary for the protection of navigation. In the course of the controversy, at the request of defendant, the Attorney General of the United States was requested by the Commission to give an opinion as to the right to issue a minor part license. In response to such request, the Attorney General, on September 22, 1930, rendered an opinion in which, after reviewing the facts, he states:

"Upon the facts stated by the Commission in this case the United States has no power to prevent the construction of the proposed project on the New River unless its operation will tend to impair the navigation on the Kanawha by changing the regular and normal flow of the stream; and the only interest which the United States has to protect, and for which it may be justified in issuing a license, is a very minor part of the complete project, viz, the manner in which the flow of the stream
178 below the dam is affected by the operation of the water power. I am advised by a representative of the Commission that under a license providing merely for proper control of the retention and release of water, this project will tend to improve the navigability of the Kanawha Rvier. Under these circumstances every purpose within the power of Congress may be accomplished by the issuance of a minor part license under paragraph (i) of Section 10.

* * * * *

This interpretation appears necessary in order to avoid serious questions regarding the constitutionality of the Act * * *."

Shortly after the rendition of this opinion by the Attorney General, and before any action was taken on it, the personnel of the Power Commission was changed. The records do not show that the new Commission gave any consideration to the opinion of the Attorney General, and on April 3, 1931, it formally denied

the application for a minor part license, tendered the defendant a standard form license and ordered that construction of the project should not be started until such standard form license had been accepted.

The defendant thereafter, and as hereinbefore recited, made application to and received authorization from the State of Virginia to construct the project and indicated its intention to proceed with the construction. Thereafter, at a meeting held on October 12, 1932, the Federal Power Commission, without any further hearing and without any additional evidence, so far as the record shows, reversed the finding of the old Commission that the stream was not navigable and made a formal finding and declaration that the "New River, from the mouth of Wilson Creek, Virginia, north, is navigable waters within the definition * * * of the Federal Water Power Act." The reason of this action was apparently to strengthen the position of the Commission in any litigation aimed at preventing the construction.

Effect of the Federal Water Power Act

The argument of counsel on the Federal Water Power Act has taken a wide range. Much of it, on the part of plaintiff, has been upon the premise that New River is navigable waters of the United States. The defendant, while submitting some argument based on the contingency that such a finding might be made, has steadfastly maintained that the river is not navigable and the mass of its argument is upon that basis. The finding of the Court that the river is not navigable waters eliminates the
179 necessity for discussion of much that has been said in the briefs of counsel.

Prior to the enactment of the Federal Water Power Act in 1920, the statutes specifically providing means for the protection of navigation were the Rivers and Harbors Acts. The Act of September 19, 1890, 26 Stat. 454, provided (so far as pertinent here):

"Sect. 7. That it shall not be lawful to build any wharf, pier * * * dam * * * in any navigable water of the United States, * * * without *permission of the Secretary of War* * * * in such manner as shall obstruct or impair navigation. * * *"

"Sect. 10. That the creation of any obstruction, *not affirmatively authorized by law*, to the navigable capacity of any *waters in respect of which the United States has jurisdiction*, is hereby prohibited * * *"

It was Section 9 of this act which was before the court in United States v. Rio Grande, etc., supra, and which the court

construed to prohibit the erection of a dam in a nonnavigable stream where the effect thereof was to so interfere with the flow as to impair the navigable capacity of a navigable river of which the obstructed stream was a tributary.

The River and Harbors Act of March 3, 1899, 39 Stat. 1151; 33 U. S. C. 401, et seq., which is still in effect, provides:

"Sect. 9. It shall not be lawful to construct * * * any bridge, dam * * * in any * * * navigable water of the United States until the *consent of Congress* to the building of such structure shall have been obtained * * *."

Sect. 10. The creation of any obstruction not affirmatively *authorized by Congress*, to the navigable capacity of any of the *waters of the United States* is hereby prohibited; * * *"

Sect. 7 of the Act of 1890 and Sect. 9 of the Act of 1899 refer to structures in navigable waters of the United States (physically present therein). Aside from some change of wording and sentence structure, the only essential difference between the two acts is that in the former the consent of the Secretary of War was necessary for the construction, while in the Act of 1899 the authorization of Congress is required. The italics in the quotations above have been supplied by the Court for the purpose of indicating the amendments.

Sect. 10 in each act refers to obstructions to the navigable capacity of a navigable water, covering the situation where the obstruction may be physically located outside of the navi-
180 gable water, but be of such nature as to interfere with navigation in the latter. The amendments here made are in changing the words "authorized by Law" (in the Act of 1890) to "authorize by Congress" (Act of 1899), and in amending the words "waters in respect of which the United States has jurisdiction" to read "waters of the United States." We are not concerned with the effect of or reasons for the first of these amendments and, as to the second, it seems clear that there was no attempt at extension of authority, but merely an effort to eliminate an unusual phrase, and substitute a synonymous one of more accepted usage.

As the act now stands, it prohibits (in Sect. 9) the erection of any structure in a navigable water of the United States, without authority obtained therefor, without reference to the effect of such structure on navigation or otherwise. This is apparently on the theory that the United States has the plenary power over its navigable waters to forbid the erection of any structure therein, without regard to the purpose or effect of such structure.

But when it comes to dealing with structures located in nonnavigable streams, no such plenary power exists, nor is it assumed by the act. That portion of the act (Sect. 10) relating to the

obstruction to navigable capacity places a ban upon any structure, anywhere, if its effect is to interfere with the navigable capacity of a navigable water. But the condition of the prohibition is that the structure should so interfere. If it does not so interfere, the act sets up no prohibition against it, and requires no authority for its erection. The authority of the United States in such cases, i. e., of structures located outside of navigable waters, goes only to insuring that there be no interference with navigation in waters that are navigable, and only to the extent necessary to protect such navigation, and may be invoked only upon proof of the fact of such obstruction. This is, I think, the plain meaning of the Rio Grande case.

I am unable to see that the application of these principles has been altered by the Federal Water Power Act of 1920. That act appears to be not primarily for the protection of navigation, but rather to provide conditions under which the water power of navigable streams might be developed for the production of electric power. The title of the act indicates this object and the Commission created for carrying out its purpose is designated
181 the Federal Power Commission. In the Code, the act is published under the title Conservation, not under Navigation and Navigable Waters; nor does it repeal the Rivers and Harbors Act of 1899, which provides for the protection of navigable waters.

The provisions of the act pertinent to this case are the following. After creating the Federal Power Commission and defining the meaning of terms used in the act, it is provided that the Commission, among other powers, is authorized (Sect. 4 (d)):

"To issue licenses to citizens of the United States, * * * or to any corporation * * * for the purpose of constructing, operating, and maintaining dams, water conduits, reservoirs, powerhouses, transmission lines, or other project works necessary or convenient for the development and improvement of navigation, and for the development, transmission, and utilization of power across, along, from, or *in any of the navigable waters of the United States*, or upon any part of the public lands and reservations of the United States." [Italics supplied.]

Sect. 10 of the act sets forth the conditions upon which licenses shall be issued. These conditions are substantially those which the Commission sought to impose upon the defendant in the so-called standard form license. Among them is the condition (Sect. 10 (c)) that the licensee shall "so maintain and operate said works as not to impair navigation." There are many other conditions having no relation to navigation.

In subsection (i) of Section 10, it is provided that—

"In issuing licenses for a minor part only of the complete project * * * the commission may in its discretion waive such conditions, provisions, and requirements of this Act, except the license period of fifty years, as it may deem to be to the public interest to waive under the circumstances * * *."

The most important provisions of the act for the purpose of this case and the ones around which dispute centers are those in the second paragraph of Sect. 23, reading as follows:

"That any person, association, corporation, state, or municipality intending to construct a dam or other project works across, along, over, or in any stream or part thereof, other than those defined herein as navigable waters, and over which Congress has jurisdiction under its authority to regulate commerce between foreign nations and among the several states, may in their discretion file declaration of such intention with the Commission, whereupon the commission shall cause immediate investigation of such proposed construction to be made, and if upon investigation it shall find that the interests of interstate or foreign commerce would be affected by such proposed construction, such person * * * shall not proceed with such construction until it shall have applied for and shall have received a license under the
182 provisions of this Act. If the commission shall not so find, and if no public lands or reservations are affected, permission is hereby granted to construct such dam or other project works in such stream upon compliance with state laws."

The real question at issue is whether the power of the Commission to require a license is limited to those projects proposed to be constructed in navigable waters or whether it extends to projects located in nonnavigable streams but which will, in the opinion of the Commission, obstruct the navigable capacity of a navigable water. Counsel for plaintiff appears to concede that the Power Act undertakes no enlargement of governmental powers over those granted in the Rivers and Harbors Act of 1899, for it is said in plaintiff's brief:

"Section 9 of the Rivers and Harbors Act of 1899, referred to above, operated as a regulation of the use of navigable streams for the purpose of creating power, because its necessary effect was to require a person who desired to use a navigable stream for that purpose to obtain the consent of Congress. Until 1920 the only way in which that consent could be obtained was by applying to Congress itself for the passage of a special act of authorization. The Power Act of 1920 provided an alternative method of obtaining congressional consent by applying to the Commission for a license, which the Commission was authorized to issue on the terms and conditions specified in the Act."

It is then argued, apparently, that the same reasoning applies as to Sect. 10 of the Act of 1899, i. e., that the necessary effect of that section was to require the consent of Congress to the construction of a dam in a nonnavigable stream, if such structure impaired navigable capacity elsewhere, and that the Power Act of 1920 provided that this consent be obtained in the form of a license from the Power Commission. The implication is that Congress had a right to require its previous authorization before there could be constructed in a nonnavigable stream a dam which would impair navigable capacity elsewhere, and that it has simply delegated this power to the Commission; and has further empowered the Commission to make final determination of whether such dam will obstruct the navigable capacity elsewhere.

I do not think such argument is tenable, nor that the case of United States v. Rio Grande, etc., which is cited to sustain it, bears such a construction. The Act of 1899 does not require a license for the construction of a project in a nonnavigable stream nor does it make such a project unlawful per se without the authorization of Congress. Such a contention was
183 made in the Rio Grande case where an injunction was sought against the construction of the project on the ground that, not being previously authorized by Congress, it was unlawful. The court in effect denied such contention. It refused to enjoin the construction simply because it had not been previously authorized, and held that only upon proof that the operation of the project would interfere with navigation elsewhere could it be prohibited. The mere construction, or proposed construction of a dam in a nonnavigable stream does not authorize the exercise of Federal jurisdiction. That jurisdiction may be exercised only upon proof that through operation of the project, by appropriation of the water or otherwise, there is an actual interference with the navigable capacity of a navigable water. And the Federal control over operation of the project goes only to the extent necessary to protect navigable capacity in such navigable waters as are affected. It is to be remembered that the jurisdiction of the United States in all such instances grows only from the power to protect interstate commerce and is limited to the steps necessary for that purpose.

A consideration of the language of the Water Power Act, as well as of the circumstances attending its enactment, leads to the conclusion that the construction contended for by the plaintiff cannot be upheld, but that on the contrary Congress did not intend to confer authority to require a license for a project in a nonnavigable stream. The language of the act which is the source of controversy is that portion of Sect. 23 (heretofore quoted) which

provides that persons who desire to erect a dam in "any stream or part thereof, other than those defined herein as navigable waters, and over which Congress has jurisdiction under its authority to regulate commerce * * * among the several states, may in their discretion, file declaration of such intention * * *." And that if the Commission shall find that the interests of interstate commerce would be affected by the proposed construction, the declarant shall obtain a license "under the provisions of this Act."

The defendant urges that Sect. 23 was enacted to provide for the situation where the erection of a dam was contemplated in waters,
the navigable status of which was in doubt; and in order
184 that, before proceeding with the construction, the declarant
might obtain from the Commission a finding as to whether it held the stream to be a navigable water. It must be said that the language used is somewhat lacking in clarity, but I think the interpretation now urged by the defendant finds support not only in the legislative history of the act but also in a study of all its terms. This part of Sect. 23, (the 2d paragraph) was added to the original bill as a Senate amendment (being considered as amendment No. 58). When the bill came from conference, the report of the Managers on the part of the House stated: (House Document 910, 66th Congress 2d Session):

"This amendment seeks to prescribe how a stream of doubtful navigability may be determined as within the provisions of the law, and in substance it provides that the Commission shall ascertain whether the interests of interstate commerce are affected; if not, permission is granted to construct in accordance with the state laws."

During the course of the Senate debate, Senator King, of Utah, stated (59 Cong. Rec. 1103):

"I am afraid that under this bill and under the definitions to which I have called the Senator's attention it will be asserted by those having the administration of the bill that every little stream or rivulet that finds its way directly or indirectly into a larger stream which may become navigable is under the jurisdiction of this commission, so that no man may go upon these little streams and utilize the waters therein flowing for power or other purposes contemplated by this bill, or within the scope of this bill, without obtaining permission from the commission which is created by this bill."

To which Senator Nelson, referring to Sect. 23, answered:

"I think the apprehensions of the Senator from Utah are not warranted. If the whole paragraph be read and considered as an entirety, it will appear that it relates only to navigable streams. It starts out here with the phrase 'over which Congress has jurisdiction.' The authority of Congress over streams relates to utiliz-

ing them for navigation for commercial purposes under the interstate commerce clause of the Constitution. This covers streams either in their natural condition or streams that Congress by appropriation has improved and made navigable. They are all subject to the provisions of this bill.

"I want to call the attention of the Senator in this connection to another provision of the bill in Sect. 23, which relates to construction of dams over portions of streams that are not navigable. The commission in that case is authorized to investigate and if it finds that they are local streams, not navigable, not used for interstate commerce, it can grant authority for the improvement of the streams subject to state laws."

Further in the debate, Senator Jones, referring to Section 23, said (59 Cong. Rec. 7729):

185 "May I suggest further in connection with this matter that the Senate placed amendment No. 58 on the bill, under which it provides a way by which a person or company or corporation may get the judgment of the commission with reference to whether a stream is navigable, if they desire to do it. That is for the protection of any person who contemplates putting a dam in a navigable stream. If they exercise the right given to them in this section of the bill, the commission will first make an investigation to see whether or not the stream is navigable and they cannot put their dam in it if the commission says that it is navigable; but if the commission says that it is not navigable, then permission is granted to put the dam in. However, there is nothing which requires them to come to the commission in the first instance and ask their judgment as to whether the stream is navigable or not."

These quotations, and others that might be made, indicate that the purpose of Congress was to delegate to the Power Commission the right to approve the erection of structures in navigable waters, an act which had theretofore, under Sect. 9 of the Act of 1899, required Congressional approval in each case. As said by Senator Walsh of Montana in the course of the debate:

"This is the purpose of the bill. Under the existing law anyone who wants to put any obstruction whatever in a navigable stream must come to Congress and get a special act. The pending bill is a general act, granting the power to give permits through the Commission. That is the purpose of it." (59 Cong. Rec. 7729.)

They indicate further that the purpose of Sect. 23 was to give a person contemplating such construction an opportunity to have the judgment of the commission as to whether the stream in which he proposed to erect his project was a navigable water, and thereby determine whether it would require a license. But they do not indicate an intention on the part of Congress to require a license

for a structure in a stream not in itself navigable, nor to invest the Commission with any powers greater than those which Congress itself exercised.

Indeed the Power Commission itself seems, in the early days of its existence, to have had no doubt about the purpose of the act nor as to the limits of its powers, for in its First Annual Report, the Commission states as to its jurisdiction.

"The Federal Water Power Act did not propose to bring any new streams within the authority of the Federal Government. It proposed rather to provide a method whereby the status of doubtful streams could be determined, and to set forth in definite form the conditions under which rights upon such streams could be acquired."

186 And again in 1924, in its Fourth Annual Report, the Commission states:

"The Commission has not been given general authority to protect navigation or power interests."

Not only do these expressions in the Congressional debate and the expressions of the Commission itself as to the extent of its authority deny the rights to require licenses for structures on nonnavigable streams, but it does not appear that the language of the Power Act justifies such an interpretation. If Congress had intended to take any such far-reaching step, had intended to invest the Commission with the powers which the latter now claims and which are greater than any powers which Congress itself had attempted to exercise, surely it could, and no doubt would, have found language to make its intention clear. As before stated, Sect. 23 was inserted as an amendment to the original bill. Omitting this amendment, it is found that the remaining portions of the statute are consistent and unvarying in their reference to navigable waters only. Had it not been for this amendment there could be no question that Congress was providing a procedure applicable to navigable waters alone. The section of the act (Sect. 4 (d)) which empowers the issuance of licenses authorizes them only as to projects on navigable waters or upon public lands of the United States. If it had been meant by Sect. 23 to give the Commission a similar power over nonnavigable streams, it seems that Sect. 4 (d) would have been correspondingly amended to authorize the issuance of licenses on such nonnavigable streams. But this was not done and the only direct authorization in the act for the issuance of licenses confines them to projects located in navigable waters or on public lands and reservations.

It will be noted that the filing of a declaration of intention under Sect. 23 was discretionary on the part of the person contemplating erecting a dam. This fact argues strongly against the interpretation now claimed by the plaintiff. If it had been intended to give

the Commission a power as to nonnavigable streams equal to its authority over navigable waters, why should the filing of a declaration of intention be left discretionary? If plaintiff's contention as to the interpretation of Sect. 23 is correct, we have this situation: That one person might file a declaration of intention and, as it sought in the instant case, be prevented from pro-
187 ceeding with the construction until he had accepted the conditions imposed by the Commission. Another person might proceed with the construction without ever approaching the Commission and could not be halted because the act itself authorized him to use his discretion. Only after he had begun operation and it appeared that his project formed an obstruction to navigable capacity elsewhere could the Federal Government intervene by resort to the courts and then only to the extent necessary to protect navigation. United States v. Rio Grande, etc., supra. All of which but adds strength to the view that the purpose of Sect. 23 was merely to furnish a means whereby a person contemplating erection of a structure in a stream of doubtful navigability might, for his own protection, obtain the judgment of the Commission as to whether a license was required. It is true that in 1935, since this controversy arose, the act has been amended so as to require declarations of intention to be filed. But this, in my opinion, carries no different implication as to the intention of Congress as to the issuance of licenses on nonnavigable streams. The requirement for a declaration of intention in the present act is necessarily in terrorem merely. If it were ignored, the only power of the Federal Government would be to go into court and, upon showing that the operation of the project interfered with navigable capacity, compel the operation to be so regulated as not to interfere.

It is not believed that Congress intended to invest the Power Commission with any authority over the erection of power projects in nonnavigable streams different and greater than Congress itself possessed under existing law. Under the Act of 1899, the authorization of Congress is required as a prior condition to the erection of any structure in navigable waters of the United States. The duty of granting such prior authorization Congress delegated to the Power Commission. But no such prior authorization by Congress was required as to projects in nonnavigable streams and Congress had never assumed that it had the power to require it. It is hard to believe that Congress intended to invest the Commission with powers which Congress itself had never undertaken to exercise or assumed to possess.

It is upon this failure to realize the difference between
188 the extent of the Congressional power over a navigable water of the United States and its power over a nonnavi-

gable stream that the contention of the plaintiff is at fault. Its position is summed up in the following quotations from its brief:

"The question raised by Section 23 is whether the power to require Congressional consent is as absolute and unqualified when exercised with respect to a project which impairs navigable capacity as the power is when it is exercised with respect to a project located in a navigable stream."

* * * * *

"The pertinent decisions of the Federal courts support the argument that the power of Congress to grant or to withhold consent is just as wide in scope when it is exercised with relation to a project which impairs navigable capacity as it is when exercised with relation to a project located in a navigable stream."

It is upon this argument that the plaintiff seeks to justify not only the right of the Commission to require a license as a prior condition to the erection of a dam in a nonnavigable stream, but also its right to embody in that license all of the various condition to a project which impairs navigable capacity as it is when stream, including those which have no relation whatever to the protection of navigation or navigable capacity. Enough has already been said to make it clear that this Court does not find itself in accord with this view of the law. It is not necessary here to discuss or to define the extent of the powers of the United States in its navigable waters. Whether they are unlimited, as plaintiff implies, is not for decision here. But as to nonnavigable waters they are not unlimited. Such authority as the United States has over waters that are not navigable exists only because of its right and duty to protect navigation in waters that are navigable, and this power may be exercised only when it is shown that a nonnavigable water is so utilized as to interfere with navigation in a navigable water, and only to the extent necessary to protect such navigation.

The plaintiff contends, as I understand it, that the Power Commission has the right to determine in advance whether a structure to be erected in a nonnavigable stream will affect navigable capacity elsewhere, and that, if it does so determine, then the proposed structure is to be treated in all respects as if it were to be erected in navigable waters, and the Commission may
189 impose as a condition of its erection the acceptance of a license containing any and all conditions which might be imposed on projects in navigable waters, even though these conditions may have no connection with or relation to the protection of navigation. And it is further contended that the finding of the Commission on the question of whether the proposed structure will interfere with navigable capacity elsewhere is final, and not subject to review by the courts.

If the Water Power Act were construed as having this effect, there would, in my opinion, be no escape from the conclusion that Congress had exceeded the powers granted it by the Constitution. It is a well settled principle that any legislative enactment should be construed, where it is reasonably possible to do so, in such manner as to avoid a holding of unconstitutionality or even to raise serious question of constitutionality. Interstate Commerce Commission v. Oregon-Washington, etc., Co., 288 U. S. 14; Crowell v. Benson, 285 U. S. at p. 62. It is not meant that, in order to uphold constitutionality, a court is justified in adopting a strained and illogical construction at variance with the plain meaning of the act. If the unconstitutional purpose is clear, the statute must fall. But in this case the Court is not facing the problem of seeking a means to uphold the constitutionality of the law. No such search is necessary. It is presumed that the Congress knows the constitutional limits of its powers and intends to keep within them. As has been stated, the antecedent history of this legislation, the declarations made on the floor of Congress in the course of the proceedings wherein it was enacted, and the reasonable meaning of the language of the act itself, all indicate a purpose within the recognized powers of Congress. That purpose was to vest in the Power Commission the authority to grant permits for, and to exercise supervision over, the construction and operation of projects in the navigable waters of the United States, a power which Congress itself had previously exercised; and, as incidental thereto (as provided by Sect. 23) to furnish an opportunity to persons contemplating the erection of dams or other structures to have it determined in advance of such construction whether the proposed structure was one over which the Commission would seek to exercise control.

190 To give the act the interpretation now claimed for it would require a strained and unnatural construction and one contrary to every proper presumption. It would be to say that the Power Commission, merely by its own declaration (not appealable or reviewable) that the interests of interstate commerce could be affected, could prohibit the erection of any dam or other structure in any stream in the United States, no matter how small or remote, unless and until the owner of the project agreed to build and operate it upon such conditions as the Commission imposed and that these conditions might include supervision over the financial operations of the builder and regulation of his earnings from the project. Under such conditions citizens would be deprived of the use of their property and the power of the states to develop their natural resources as they might deem best for the welfare of their people would be completely throttled. Individuals, municipalities, and sovereign states could exercise

their most valuable property rights only at the will of an agency of the Federal Government and would be powerless to resort to the courts for protection against any arbitrary and ill-founded finding of such agency. Facing such a situation, it is not natural that the Attorney General of Virginia should state in his brief that

"The Commonwealth of Virginia denies the right and vigorously protests the attempt of the Plaintiff to prevent, burden, or retard the development of her water resources in contravention of the established policy of the State * * *."

It is my opinion that the powers which the Commission now seek to exercise cannot be inferred from the provisions of the statute. That they are based upon inferences drawn by the Commission itself is shown by a statement made in the Tenth Annual Report (1930) of the Commission, after this controversy had arisen, and apparently in explanation of its position, where it is said:

"The law contains no express authority for the issuance of licenses for such projects on nonnavigable streams, but the authority to do so seemed a suitable inference from the provisions of Section 23."

I think it pertinent to point out that the record of this controversy before the Commission strongly suggests the completeness and finality of the control which the Water Power Commis-
191 sion might exercise over the streams of the country through the exercise of the arbitrary and uncontrolled powers claimed. After the filing of the declaration of intention, the Commission, pursuant to the statute, undertook an investigation as to the character of New River and the effect of the project and requested a report from the Chief of Engineers in this respect. In his final report, the Chief of Engineers reported that New River was not a navigable stream and further that the project would not interfere with navigation on the Kanawha. In spite of this the Commission, while adopting the report as to navigability, found that the project would interfere with interstate commerce. Possibly it had evidence other than the report of the Chief of Engineers but, if so, the nature of that evidence does not appear. The defendant then agreed to every condition which the Commission proposed for the protection of navigation, but the Commission, ignoring the advice of the Attorney General, still refused permission to proceed unless the defendant would accept other conditions having no relation to navigation. And finally the Commission, with no additional evidence, abruptly reversed the finding of its previous personnel and held that the river was a navigable water of the United States.

Surely the courts have right to review proceedings of this sort where the constitutional rights of citizens and states in the use and enjoyment of their property are concerned. I wish to make it clear that the plaintiff has not contended that the Commission has the final power to determine whether a stream is navigable or not. But it does contend for the final power to determine whether a structure in a nonnavigable stream will interefere with navigable capacity elsewhere. I can see no difference in principle as between the two situations. Each involves the determination of a fact upon which constitutional rights depend. In the first instance, that fact is whether the stream is a navigable water of the United States. Neither Congress nor any agency created by it can make a stream a navigable water of the United States by declaring it to be such. It is too well settled to require citation of authority that the determination of facts upon which constitutional rights depend cannot be taken from the courts.

In the second instance, the fact upon which the Federal power is dependent is that the structure interferes with the navi-
192 gable capacity of a navigable water of the United States. Upon the existence of that fact the constitutional power of Congress to intervene depends. And inasmuch as upon that fact depends the constitutional right of citizens to the use of their property, it follows that they cannot be deprived of the rights to resort to the courts for their protection. As said in Crowell v. Benson, 285 U. S. 22 (at p. 56–60):

"It is the question whether the Congress may substitute for constitutional courts, in which the judicial power of the United States is vested, an administrative agency * * * for the final determination of the existence of the facts upon which the enforcement of the constitutional rights of the citizen depend."

* * * * *

"In cases brought to enforce constitutional rights, the judicial power of the United States necessarily extends to the independent determination of all questions, both of fact and law, necessary to the performance of that supreme function."

A summary of my conclusions as to the proper interpretation of the Water Power Act and its application may be thus stated:

That it was not intended by the act to authorize the Power Commission to exact licenses as a prior condition to the erection of a power project, unless the project is to be located in a navigable water of the United States or upon some part of its public lands or reservations; and that the asserted power of the Commission to require a license as a prior condition to the erection of a project in a nonnavigable stream is not contemplated in nor authorized by the statute.

That if the act were construed (contrary to what, in my opinion, is its manifest purpose) to authorize the Commission to require a license as a prior condition to the erection of a project in a nonnavigable stream, there would be grave question of its constitutionality.

That even if the act could be construed to authorize the Power Commission to exact a license for a project upon a nonnavigable stream, and could be constitutionally upheld as to that power, such power could go no further than to impose upon the operation of the project such conditions as were reasonably necessary to the protection of navigation and that the exaction from the licensee of compliance with conditions having no relation to the protection of navigation would render the act unconstitutional in that respect.

193 That findings made by the Commission, either as to the navigability of a stream or as to the effect upon interstate commerce of a project located in a nonnavigable stream, are not final, but are in each case the subject of determination de novo by the courts when such findings are challenged.

Other conclusions both as to facts and upon the law have been stated in the course of this opinion and need not be restated here. As has previously been stated, the Court has, upon the evidence before it, found it to be a fact that defendant's project is not located upon a navigable water of the United States nor upon any public lands or reservations of the United States. It has further found as a fact that neither the construction nor operation of defendant's project will obstruct the navigable capacity of the Kanawha River or any other navigable water of the United States and that it will not involve any lands or other property of the United States. It follows that since the facts show that no interest of the United States will be involved or affected, the United States has no authority to interfere with or attempt to regulate or control the construction or operation of the project through the agency of the Power Commission or otherwise; and that the defendant is free to proceed with the construction of its project under authorization of the State of Virginia.

By this it is, of course, not meant to hold that all rights of the United States to complain of this project are forever barred. If at any time in the future the project should be operated in such manner as to interfere with the navigable capacity of the Kanawha or any other navigable water (a contingency which appears most improbable) the United States will not be barred from asserting its right to protect this navigable capacity by compelling a removal of the structure or such modification of its operation as is necessary. But I am convinced that the evi-

dence in this case does not disclose grounds for the issuance of an injunction at this time and the prayer for an injunction will be denied and the bill dismissed.

JOHN PAUL, *District Judge.*

APRIL 22, 1938.

194 In United States District Court

[Title omitted.]
[File endorsement omitted.]

Findings of fact and conclusions of law

Filed May 2, 1938

In accordance with the views expressed in its written opinion rendered herein, and in addition to the matter therein stated, the Court sets out the following findings of fact and conclusions of law to be entered as a part of the record in this cause:

Findings of Fact

1. The defendant is a corporation duly organized and existing under the laws of the State of Virginia and is engaged in the business of producing, distributing, and selling electric power.

2. The defendant has begun and is proceeding with the construction of a hydroelectric development on New River in the State of Virginia near the City of Radford in Pulaski County in said state and intends to operate the same when completed. The project consists of a concrete dam in and across New River with the usual machinery, equipment, and appurtenances for the generation of electric power.

3. The project is situated wholly within the State of Virginia and does not involve the use of any lands or other property of the United States.

4. The bed of New River at the site of the project is owned by the State of Virginia and all lands adjacent to the river which will be affected by the project have been acquired by and are now owned by the defendant.

5. The defendant has acquired a license or permit for the construction and operation of said project from the State of Virginia and is proceeding in accordance with the terms and
195 conditions of said license.

6. The defendant, prior to the institution of this suit, filed before the Federal Power Commission a declaration of intention to construct and operate said project.

7. The Federal Power Commission made a finding that the interests of interstate or foreign commerce would be affected by the project and sought to require defendant, before proceeding with construction thereof, to accept a license from said Federal Power Commission and tendered to the defendant a license therefor.

8. That the license tendered by said Federal Power Commission contained, among others, certain conditions having no relation to the protection of navigation, in any navigable water of the United States, but which undertook to control and regulate the financial operations of the defendant in the construction and operation of its project. The defendant indicated its willingness to accept a license containing conditions for the protection of navigation in any navigable water of the United States, but objected to and refused to accept a license containing conditions having no relation to the protection of navigation.

9. The defendant having refused to accept the license tendered by the Federal Power Commission and the said Commission having refused to modify the terms of the license tendered by it, the defendant proceeded with and is continuing construction of its project without a license or permit from the Federal Power Commission or from any other agency of the United States.

10. That, following the beginning of said construction, the plaintiff brought this suit, praying that the defendant be enjoined from constructing or operating its project until it had procured from said Federal Power Commission a license in the form and containing the conditions required by said Commission or, in the alternative, that the defendant be required to remove any part of its project already constructed.

11. The New River has its sources in the northwestern
196 part of the State of North Carolina and flows in a general north and northwesterly direction through the counties of Grayson, Carroll, Wythe, Pulaski, and Giles in the State of Virginia and, after crossing into the State of West Virginia, flows in a general northwesterly direction for a distance of approximately 90 miles to Gauley in Fayette County, West Virginia, at which point it joins with the Gauley River, and these combined streams form the Kanawha River, which flows for approximately 95 miles across to Point Pleasant, West Virginia, where it empties into the Ohio River.

12. The Kanawha River, from its mouth to a point 7 or 8 miles below the junction of the New and the Gauley rivers is a navigable water of the United States.

13. The New River is not a navigable water of the United States, either at the site of defendant's project or elsewhere

throughout its course. The site of defendant's project is approximately 152 miles above the mouth of New River and approximately 160 miles above the head of navigation on the Kanawha River.

14. The defendant's project is not located in or upon any navigable water of the United States nor upon any public lands or reservations of the United States.

15. The construction of the defendant's project will not obstruct the navigable capacity of the Kanawha River or of any navigable water of the United States. And the operation of defendant's project in any normal, rational, or probable method of operation will not obstruct or impair the navigable capacity of the Kanawha or any navigable water of the United States and will not affect the interests of interstate commerce.

16. No property of the United States will be damaged by the construction or operation of the project.

Conclusions of law

1. New River is not a navigable water of the United States.

2. Findings made by the Federal Power Commission, either as to the navigability of a stream or as to the effect upon interstate commerce of a project located in a nonnavigable stream, are not final, but in each case are subject to determination by the courts.

197

3. Under the provisions of the Act of Congress of March 3, 1899, 30 Stat. 1151, 33 U. S. C. 401 et seq., known as the Rivers and Harbors Act, the United States is empowered to compel the removal of a dam or other structure or project from a nonnavigable stream only upon proof that the same obstructs the navigable capacity of a navigable water of the United States, and the said Act does not authorize the exaction of a license for the construction of such project.

4. The Federal Power Act does not repeal the Rivers and Harbors Act so far as the latter relates to nonnavigable streams and Congress did not intend nor propose, by the provisions of the Federal Power Act, to vest in the Federal Power Commission the authority to require a license as a prior condition to the construction of a project in a nonnavigable stream.

5. That the Federal Power Act authorize the Federal Power Commission to exact licenses as a prior condition to the construction of a power project only when the project is to be located in a navigable water of the United States or upon the public lands or reservation of the United States.

6. That the Federal Power Commission, in attempting to impose a license for the erection of defendant's project in a nonnavi-

gable stream and where no property of the United States is involved, exceeded the powers granted to it by the Act of Congress.

7. That even if, contrary to conclusions numbered 4 and 5 above, the Federal Power Act could be construed as vesting authority in the Federal Power Commission to require a license as a prior condition to the erection of a project in a nonnavigable stream, the conditions of any such license must be limited to those designed for the protection of navigation and the Federal Power
198 Commission is without authority to embody in said license conditions having no relation to the protection of the navigable capacity of any navigable water of the United States. That the Federal Power Commission is without the constitutional power to require the defendant to accept a license in such form as tendered by the Commission and containing conditions not designed for and having no relation to the protection of navigation.

8. That even if the Federal Power Commission has the authority to require any license for a project on a nonnavigable stream, its action in seeking to impose upon defendant a license containing conditions, which is has no constitutional right to impose, bars its right to the relief prayed for, and its bill of complaint is without equity.

9. That a decree should be entered dismissing the bill of complaint.

(Signed) JOHN PAUL,
Dist. Judge.

APRIL 29, 1938.

199 *In United States District Court*

[Title omitted.]

Final decree and order

May 10, 1938

This cause having come on for final hearing upon the Bill of Complaint as amended and Answer as amended and other pleadings filed, upon the evidence of witnesses taken in open court and by deposition and upon the exhibits filed in evidence and upon arguments of counsel, both by written briefs and orally; and the Court having rendered its opinion in which are embodied its findings of fact and conclusions of law which were intended to stand for the findings of fact and conclusions of law required by Equity Rule 70½, and the Court having subsequently, in view of the decision of the Supreme Court in Interstate Circuit, Inc., et al. va. United States, — U. S. —, decided April 25, 1938, also made

and entered of record additional separate findings of fact and conclusions of law under Equity Rule 70½;

Now, therefore, upon consideration of the same and for the reasons which have been stated in a written opinion of the Court, which is hereby made a part of this record and upon the findings of fact and conclusions of law embodied in said opinion of the Court and upon the additional separate findings of fact and conclusions of law made and entered of record by the Court under Equity Rule 70½, it is the opinion of the Court that the Bill of Complaint is without equity and that the prayer thereof should be denied, and it is, therefore, accordingly ordered that the prayer of said Bill of Complaint be, and the same is hereby, denied and that the Bill of Complaint be, and the same is hereby, dismissed.

200 It is further ordered that an exception is hereby granted to the plaintiff to the entry of this decree, to each finding of fact, and conclusion of law made by this Court in its opinion and in its findings of fact and conclusions of law and to the failure of the Court to affirm and adopt each of the findings of fact and conclusions of law presented and requested by counsel for the plaintiff.

Enter:

(Signed) JOHN PAUL, *Judge.*

201 In United States District Court

[Title omitted.]

Assignment of errors, as amended

And now, this 29th day of July 1938, the United States of America, plaintiff in the above entitled case, complains that in the proceedings had in such case and in the final decree entered therein on May 10, 1938, the District Court committed manifest error to the prejudice of the said plaintiff as more particularly specified in the following assignment of errors upon which the plaintiff relies to sustain the appeal prayed for to the United States Circuit Court of Appeals for the Fourth Circuit:

(1) In denying plaintiff's motion to strike defendant's answer;

(2) In entering its final decree dismissing the bill of complaint and denying the prayers for relief contained therein, in that the evidence as a whole failed to support the findings of fact made and entered by the Court, the conclusions of law drawn therefrom and the decree based thereon;

(3) In failing to adopt each of the findings of fact numbered 1 to 54, inclusive, presented and requested by plaintiff; all of which were in accord with the clear weight of the evidence, error being

assigned separately to the failure and refusal to make each of said proposed or requested findings;

(3A) In failing to make each of the conclusions of law
202 numbered 1 to 11, inclusive, presented and requested by plaintiff; all of which were based upon applicable provisions of the Rivers and Harbors Act of March 3, 1899, and of the Federal Water Power Act of June 10, 1920, as amended, correctly construed in the light of the clear weight of all of the evidence; error being assigned separately to the failure and refusal to make each of said proposed or requested conclusions;

(4) In making each finding of fact embodied in the opinion filed on the 22nd day of April 1938, and adopted by the Court as part of its findings of fact on the 10th day of May 1938, hereinafter designated in assignments numbered 6 to 27, inclusive, 29 to 37, inclusive, 39 to 44, inclusive, 66 and 67, in that each of said findings is not supported by the evidence and is contrary to the clear weight of the evidence, error being assigned separately to the making of each of said findings.

(4A) In making each conclusion of law embodied in the opinion filed on the 22nd day of April 1938, and adopted by the Court as part of its conclusions of law on the 10th day of May 1938, hereinafter designated in assignments numbered 40 and 44 to 50, inclusive; error being assigned separately to the making of each of said conclusions;

(5) In making each of its findings of fact numbered 3, 8, 13, 14, 15, and 13 in the additional findings of fact entered of record on the — day of May 1938, in that each of said findings is not supported by the evidence and is contrary to the clear weight of the evidence; error being assigned separately to the making of each of said findings;

(5A) In making its conclusion of law No. 1 in the additional conclusions of law entered of record on the — day of May 1938, and its conclusion of law embodied in the opinion hereinafter designated in assignment numbered 28, in that said conclusions (1) are predicated upon findings of fact which are not supported by the evidence and which are contrary to the clear weight of the evidence, and (2) are not supported by and are in conflict with the findings of fact made by the Court; error being assigned separately to the making of each of said conclusions.

203 (5B) In making its conclusions of law numbered 2 to 9, inclusive, in the additional conclusions of law entered of record on the — day of May 1938; error being assigned separately to the making of each of said conclusions;

(6) In making the following finding of fact embodied in the opinion:

From a consideration of all of it [the evidence], the conclusion is reached that New River is not and never has been navigable, either in its natural condition or after the improvements made, except in certain short and isolated stretches to each of which the navigation was local and confined within the limits of a single state; and that it has never been used, and has never been susceptible of use, as an avenue of interstate or foreign commerce. [Brackets supplied.]

(7) In making the following finding of fact embodied in the opinion:

The evidence indicates that the use of these [keel] boats was local, by which it is meant that they were not used in continuous trips throughout the course of the river but were used on separated stretches of the river where conditions made their use permissible and desirable. The range of their movements was determined by the extent of the pools and the absence of steep shoals in that particular section of the river. For example, from Hinton upward for 23 or 24 miles the river has the least gradient in its course, about 4 feet per mile, with considerable pool water and few precipitous shoals. The same conditions obtain to a more or less extent on the section of the river for 25 or 30 miles above Radford. It was in these separated stretches of the river that practically all of the bateaux navigation took place and only on them that there was any appreciable trade or commerce by boat. *It is not meant to say that continuous movement of such boats between Hinton and the vicinity of Radford was impossible or did not occur. There is evidence which indicates that it did occur,*[1] but there is a vagueness about the extent to which it occurred and indications that such trips were irregular, were attended with difficulty, and formed no appreciable part of any commercial transportation which took place on the river. The most definite evidence of the extent of navigation on the river are the reports of the government engineers both before and after beginning improvement of the river in 1877, and these reports repeatedly state that the commercial navigation was local to separated stretches of the stream and that there was no continuous navigation. [Brackets and italics supplied.]

(8) In making the following finding of fact embodied in the opinion:

References in this report [Chief of Engineers, 1883, Government Exhibit 39] to boat traffic on the lower division make no mention of any traffic originating in Virginia or at any
204 point higher up than 24 miles above Hinton. The traffic was clearly local to that stretch immediately above Hinton

[1] In the assignments of error referable to findings of fact embodied within the opinion those portions appearing in italics are included only in the interest of clarity and are not objectionable per se.

and entirely within the State of West Virginia. Similarly the eight boats in the middle division were in a traffic local to that section. The railroad shipping point there was at New River Bridge, just above Radford, and the principal traffic was boating pig iron down to this point from several small furnaces located 25 or 30 miles upstream. [Brackets supplied.]

(9) In making the following finding of fact embodied in the opinion (R. —):

The above somewhat detailed description of the local nature of transportation on New River has been thought desirable because of the emphasis which the plaintiff places on the pig-iron shipments to New River Bridge and upon the volume of lumber, etc., delivered by boat to Hinton. *Conceding the accuracy of the testimony in this regard*, it is clear, I think, that in each instance the traffic was purely intrastate. It occurred in two widely separated stretches of the river, one over a distance of 25 miles or more entirely in Virginia, and the other over approximately the same distance in West Virginia; and between the two was a stretch of about 60 miles over which there was no appreciable commercial traffic, and little of any sort. [Italics supplied.]

(10) In making the following finding of fact embodied in the opinion (R. —):

In 1876 Congress appropriated $15,000 for work on New River and appropriations were continued (although not each year) until 1886, the total appropriations amounting to $112,000. Pursuant to these some work was done in each of the years from 1877 to 1882, inclusive, and a small amount in each of the years 1885 and 1889. The work was confined to making channels through shoal portions of the river, but did not include all of the shoals or falls, and on some of the more precipitous ones no work was done. Neither was the improvement continuous in extent but was divided along three different sections of the river. [Italics supplied.]

(11) In making the following finding of fact embodied in the opinion (R. —):

It is difficult to determine the extent to which the volume of the keel-boat traffic was affected by the improvements made on the river, but it does appear that the work done by the Federal Government in no way altered the local character of this navigation, and apparently it was not intended to. As stated, no attempt was made to create a continuous channel throughout the course of the river. The work was confined to improvement in each of several separated sections and was with a view to facilitating the keel-boat traffic in the limited localities where it already existed. The reports of the engineers in charge of the work indicate that their main object was to facilitate the carrying of local products by boat to the railroad outlet for that locality. [Italics supplied.]

(12) In making the following finding of fact embodied in the opinion (R. —):

205 Whether the purpose of those who originally inspired and promoted the plan of improving New River with Federal funds was to make the river navigable throughout its course is not clear. But it is clear, I think, that the work done had no such purpose, but was confined to improving separated stretches of the river to aid in local transportation to railroad points. After the work started, its scope was modified by making channels of lesser depth and lesser width than mentioned in the original plan; and as the work progressed the engineers in charge emphasized in their reports that no attempt was being made to make possible continuous navigation, and that such a result could be accomplished only by some plan different and more elaborate than that attempted.

(1) In making the following finding of fact embodied in the opinion (R. —):

Agreeing that consideration should be given to this fact of Federal expenditures upon New River, I think it not illogical to give consideration also to the fact that after small local expenditures had been made all effort at further improvement was abandoned, and that the Chief of Engineers expressed it as his opinion that the improvements made had "not materially changed the natural nonnavigable condition of the river," and advised against further attempts at improvement.

(14) In making the following finding of fact embodied in the opinion (R. —):

Throughout the annual reports of the Chief of Engineers during the progress of the work on the river there are repeated statements emphasizing the local nature of the boat traffic, and pointing out that facilities do not exist for continuous traffic. And, particularly in the later years, it is reported that the latter condition could be obained only by the adoption of a more general, more radical, and more expensive plan of permanent improvement than that attempted.

(15) In making the following finding of fact embodied in the opinion (R. —):

These quotations are made at length in controversion of the contention that the Federal Government has, over a long period of years, recognized New River as a navigable stream, and asserted its authority over it as such; and to show that throughout this extended controversy the navigability of New River was clearly denied by these officers of long experience and acquaintance with it.

(16) In making the following finding of fact embodied in the opinion (R. —):

I have chosen to quote at length from the contents of these various official reports because of the weight which I consider they should have on the issue here involved. They were made by responsible officers of the War Department in the course of their official duties, and under conditions involving no thought of litigation or controversy. The facts recited are based upon actual knowledge of the river gained by surveying it, observing it,
206 and directing the work upon it. So far as their statements may be said to be expressions of opinion, their source gives value to the opinion, for they are given by men scientifically trained and experienced, and one of whose larger duties is in dealing with the navigable waters of the country; men who are acquainted with comparable streams, and who know of the requirements for commercial navigation and the engineering problems necessary to establish it where it does not naturally exist.

(17) In making its finding embodied in the opinion that the New River crosses the Virginia-West Virginia State line at a point about 160 miles below the mouth of Wilson Creek (R. —).

(18) In making its finding embodied in the opinion that at the site of defendant's project and for some miles above and below the slope of the River is from five to eight feet per mile (R. —).

(19) In making the following finding of fact embodied in the opinion (R. —):

In the course of a report made by the Secretary of War to the House of Representatives in 1935 (74th Congress, House Document No. 91) there is contained the following general description of New River which is here quoted because of its brief but accurate description of the general characteristics of the stream.

"Throughout almost its entire length the river flows through a rugged mountainous country. Its valley is narrow, the flood plain being very little wider than the low-water channel, which varies in width from about 200 to 1,000 feet. In many places the banks are sheer bluffs rising from the river's edge. Ledges of limestone, sandstone, and shale crossing the river at frequent intervals create rapids and waterfalls. The waterfalls vary in height up to about 18 feet. Between the ledges there are usually short pools of varying depths. The low-water depth in the channel varies from a few inches to more than six feet."

(20) In making the following finding of fact embodied in the opinion (R. —):

A few miles below Hinton the river enters what is known as the gorge through which it flows for approximately 45 miles in a narrow and tortuous channel between high mountains. The bed is a mass of sharp ledges and boulders and through this, with the steepest slope in its entire course, the water rushes with great velocity.

(21) In making the following finding of fact embodied in the opinion (R. —):

The lack of identity [between the New and the Kanawha] for purposes of navigation is further emphasized by the fact that the lower portion of the New River (for about 50 miles
207 above Kanawha Falls) is the most turbulent and precipitous of the entire river and forms a barrier between the navigable Kanawha and any possibly navigable water of the New. [Brackets supplied.]

(22) In making the following finding of fact embodied in the opinion (R. —):

From these reports, as well as from other evidence in the case, I think it clear that that portion of the New River from Hinton (or a few miles below) to Kanawha Falls is not navigable and never has been and is not practicably susceptible of being made navigable. I find also that while, some 60 or 70 years ago, investigations were made and tentative plans suggested for canalizing this portion of the river for purposes of navigation, no steps were ever taken for this purpose and no attempts to render it navigable have ever been made and none are now in contemplation. Due to the plainly nonnavigable character of the New River from its mouth up to Hinton, it is evident that there is and can be no connection between navigation on the Kanawha and any alleged or actual navigation on the New River; and that the plaintiff's contention that New River is a navigable water of the United States must rest on evidence that the river possesses that character from Hinton upward.

(23) In making the following finding of fact embodied in the opinion (R. —):

In 1874 General Barnard, reporting to the Chief of Engineers on the practicability of establishing navigation on the New River from Hinton to its mouth, as part of a route for transportation by water between the Atlantic seaboard and the trans-Allegheny states, stated that this could be done only by a "pure lock and dam" system whereby boats would transfer "directly from pool to pool," and that in this stretch of the river alone 60 dams would be required. He further states that, "as an engineer * * * I cannot * * * affirm its practicability, though I have no doubt that, so far as mere construction is concerned, it is so." He reported further that it would be more practicable to build "an independent canal" for this part of the route.

While failing to find that General Barnard's four comembers of the special board designated by Congress to make this survey collectively and individually reported that the project—including the New River section thereof—was entirely practicable.

(24) In making the following finding of fact embodied in the opinion (R. —):

I am unable to agree with plaintiff's contention that the early historical descriptions of New River show its availability for navigation in its natural state. These descriptions, beginning with the exploring trip of John Peter Sally in 1742, are of trips of exploration or investigation along the course of New River and, in some cases, of its tributaries. They indicate that the explorers were impressed with the size of the stream and the wild beauty of the scenery along its course, and also that
208 they were impressed with the rapid flow of the stream and its precipitous fall. It is true that large parts of these exploring trips were made by boat along the river, but there is nothing to indicate that the boats used were anything larger than was necessary to hold a few men and their limited and scanty supplies. And even so, these accounts are replete with recitals of the difficulties encountered by the rapids in the river and of frequent portages to overcome them.

(25) In making the following finding of fact embodied in the opinion (R. —):

In past time various dams and bridges have been constructed in or across New River and in some instances persons contemplating such constructions sought permission or approval therefor from Congress or the War Department. I find no instance where this was refused when sought. This appears to have been done merely as a matter of precaution on the part of those sponsoring these projects, and to clothe them with a supposed authority for what it might be worth. As tending to show recognition of Federal control over the stream, this evidence loses any value due to the fact that in a like number of instances dams and bridges have been constructed without seeking the permission of Federal authority. And where this was done I find no instance where the Federal Government has sought to interfere with or prevent it. In other words, if permission was sought, it was granted; if permission was not asked, no question was raised.

(26) In making the following finding of fact embodied in the opinion (R. —):

That the Federal Government has made no improvements on the river since those heretofore discussed and that it does not have in contemplation any improvements affecting the navigable condition of the river. That it does have in contemplation certain projects for flood control, including the erection at a point a few miles above Hinton of what is referred to as the Bluestone Dam, the proposed purpose of which is to impound the waters of New River and control their flow in times of flood and in the aid of navigation upon the Kanawha.

(27) In making the following finding of fact embodied in the opinion (R. —):

It is clear from this report [Government Exhibit 92] that General Taylor assumed that because Federal expenditures had at one time been made on the river, the Federal Government had jurisdiction over it. [Brackets supplied.]

(28) In making the following conclusion of law embodied in the opinion (R. —):

It is, therefore, found that defendant's project is not situated upon a navigable water of the United States.

(29) In finding that the defendant has no intention of operating its power plant as a peak load carrier and that the defend-
209 ant will not discharge a large volume of water for a portion of each day and close the plant down entirely, or nearly so, for the balance of the day, thus supplying the public utility system of the defendant with electric power from the Radford plant for only a portion of every 24 hours and causing violent fluctuations in the flow of New River; and that this method of operation would be uneconomical, impracticable, and unsound (R. —).

(30) In finding that even if the defendant's project were operated in the manner assumed by plaintiff's witnesses, there would be no such results in the Kanawha as claimed, and no interference with navigation thereon; and that contention of the plaintiff was that the operation of the defendant's plant will create an irregularity of flow in the river, involving periods when there will be little or no water released at defendant's dam, followed by periods when water will be turned loose in large volume, that these irregularities will create alternating rises and falls in the pools on the Kanawha and would cause oscillations in the pools, all of which would hamper and obstruct navigation in these pools and that the flow at Radford might be cut off at low water seasons, depriving the Kanawha River of its normal supply of water (R. —).

(31) In finding that the defendant has no intention of operating the plant as a peak load carrier and that water supply of the stream made this method of operation impossible, and even if it were possible it was an economically impracticable and unsound method of operation (R. —).

(32) In finding that the power waves transmitted down New River during certain tests in 1930 apparently had negligible effect on the flow of the Kanawha River (R. —); but in failing to find that these wave tests were made during a period of relatively high water and not during a period of moderate or low flow and in failing to find that the flow into navigable waters from tributary streams is of greatest importance during periods of moderate or low flow.

210 (33) In finding that the witnesses who testified for the defendant as to the effect of power waves were engineers of learning and experience (R. —), but that the witnesses who furnished the bulk of the plaintiff's testimony on the subject of power waves displayed a bias, an evasiveness, and an unwillingness to admit even obvious facts hostile to their contention, to such an extent as to deprive their testimony of much value (R. —).

(34) In finding, in effect, that the navigable capacity of the pools created on the Kanawha River by the construction of the London, Marmet and Winfield dams is not and will not be impaired by the discharge of waves directly into such pools from the operation of the power plants constructed at those dams (R. —); but in failing to find that the navigable capacity of these pools is maintained by holding the pools at fixed levels and in failing to find that when the pool levels are maintained constant the power plant operations on the Kanawha River and at the Kanawha Falls dam have caused injury to navigation on the pools below.

(35) In finding that the dam recently erected and in operation at Hawks Nest, West Virginia, about six miles above the mouth of New River, would have a marked effect on the dampening of any power waves originating above it (R. —).

(36) In finding that under no reasonable or accepted method of operation could the defendant empty its reservoir in periods of low water and shut-down for the purpose of refilling it (R. —); and failing to find that periods of shut-down of the defendant's plant would normally occur in months of low and moderate flow and that such withholding of water in the defendant's reservoir would have serious detrimental effect upon the flow of New River, the Kanawha River and the Ohio River and would alter and modify the condition, course, and capacity of New River, the Kanawha River and the Ohio River in periods of low flow.

211 (37) In finding that construction and operation of the so-called Bluestone project on New River just above Hinton, West Virginia, will remove all possibility of the alleged disturbance of the Kanawha River by power waves from the Radford dam (R. —); and in failing to find that if the pool of the Bluestone project is maintained at a constant elevation any waves released from the Radford dam will pass through the Bluestone reservoir without substantial alteration.

(38) In failing to find that construction of the Bluestone dam and reservoir will restore to present commercial usefulness the portion of New River immediately above Hinton by creating a reservoir extending into the State of Virginia, and that the navi-

gable capacity of this reservoir will be obstructed and its condition altered and modified by the operation of the defendant's project at Radford.

(39). In finding that the defendant's project could not have the slightest harmful effect on the operation of the Bluestone project (R. —).

(40) In finding that there is no provision in the Constitution giving the United States plenary control over all streams for the sole purpose of controlling floods or preventing erosion of the soil, and none from which such powers can be inferred; and that defendant's dam will be helpful in connection with the general and comprehensive plan of the Federal Government to regulate the flow of New River for the control of floods and the prevention of soil erosion; and in finding that any dam which impounds the flow of a stream with means for controlling its releases is a helpful factor in overcoming the effects of flood waters (R. —).

(41) In failing to find that the Federal Government must control the flow of tributaries of navigable waters for the purpose of reducing and preventing floods and, so far as possible, reducing the erosion of the soil along the banks of tributaries, and the transportation of sediment by tributaries in order to reduce the silting of navigation channels below; and that such control can only be exercised by the Federal Government in a comprehensive plan for entire river system such as the Ohio River system including the New-Kanawha River as a tributary; that the operation of storage reservoirs on nonnavigable tributaries of navigable waters must be controlled in harmony with the comprehensive plan of the Federal Government in order to be effective below for flood control purposes; and that operation of the defendant's project will seriously interfere with the national and comprehensive plan of the Federal Government for the development and improvement of navigation on the Ohio River system including the New-Kanawha River if not subject to Federal control.

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(42) In finding that there has been no reasonable showing that the proposed project of the defendant will have the harmful effect attributed to it, but that the most that has been shown is a theoretical possibility of interference with navigation based upon the supposition that the defendant's plant would be operated in a manner which is impracticable, not economically sound, and not in accordance with approved practice (R. —).

(43) In finding that in this case there is no such showing of any existing or potential interference with navigation on the Kanawha River as would justify the Court in issuing an injunction (R. —).

(44) In finding that the plaintiff is not foreclosed from compelling removal of the defendant's dam if in the future it should at any time prove a detriment to navigation on the Kanawha (R. —); but in failing to find that such removal could only be compelled under the authority of Congress over the flow of New River at Radford, Virginia, as being essential to maintenance of navigable capacity below, and therefore in failing to find that New River at Radford, Virginia, is subject to the jurisdiction of Congress, and hence the injunction sought by the plaintiff should be granted.

(45) In finding that the Federal Water Power Act of 1920 is not primarily for the protection of navigation, but rather to provide conditions under which the water power of navigable streams might be developed for the production of electric power (R. —); and in failing to hold and decide that this statute is for
213 the comprehensive development and improvement of all streams, navigable and nonnavigable, under Federal control for the benefit of navigation, and for the protection and improvement of the interests of interstate or foreign commerce on navigable waters.

(46) In finding that Federal jurisdiction may be exercised upon projects in nonnavigable streams only upon proof that through operation of the project, by appropriation of the water or otherwise, there is an actual interference with the navigable capacity of a navigable water, and that Federal control gives only to the extent necessary to protect navigable capacity in such navigable waters as are affected (R.—); and in failing to find that in order to protect the navigable capacity of New River the Kanawha River and the Ohio River, Federal control is necessary to prevent operation of the defendant's project in a manner which will periodically or irregularly store and release the flow of New River and store for indefinite periods the entire flow of New River at Radford, Virginia, during times of moderate and low flow.

(47) In finding that Section 23 of the Federal Power Act was enacted in 1920 to provide for the situation where the erection of a dam was contemplated in waters the navigable status of which was in doubt, and in order that, before proceeding with the construction, the declarant might obtain from the Commission a finding as to whether it held the stream to be a navigable water (R.—).

(48) In finding that there would be grave question of the constitutionality of the Power Act if it should be construed to authorize the Commission to require a license as a prior condition to the erection of a project in a nonnavigable stream (R.—).

(49) In finding that findings made by the Commission as to the effect upon interstate commerce of a project located in a non-

navigable stream are not final, but are subject to determination de novo by the courts when such findings are challenged (R.—).

(50) In finding that the State of Virginia has the right to make such use of New River as it may see fit, subject to the paramount rights of the United States (R.—).

214 (51) In failing to find that the State of Virginia has no power or authority to control the flow of New River as an interstate stream so as to injure or affect the interests of interstate commerce or the interests of the State of West Virginia, or to authorize other parties to exercise such control.

(52) In failing to find that the flow of Little River, which empties into New River immediately below the defendant's project, will be more than sufficient to furnish that flow in New River which is required every 24 hours under the terms of the license issued by the State of Virginia for the defendant's project, and for three-fourths of the time will be sufficient to furnish that flow in New River which is required every week under the State license; and that by reason of such flow from Little River, it will be possible for the defendant to control the flow of New River past its dam at Radford, Virginia, so as to completely stop the passage of water for indefinite periods of time; and that under the license granted by the State of Virginia the defendant can fluctuate the flow of New River at will during low-water periods.

(53) In failing to find that New River at the site of the defendant's project is a stream subject to the jurisdiction of Congress under its authority to regulate commerce with foreign nations and among the several States.

(54) In failing to find that the construction and operation of the defendant's project will obstruct the navigable capacity of navigable waters of the United States, namely: New River, the Kanawha River, and the Ohio River.

(55) In failing to find that the construction and operation of the defendant's project will alter and modify the condition and capacity of the channel of navigable waters of the United States, namely: New River, the Kanawha River, and the Ohio River.

(56) In failing to find that the construction and operation of the defendant's project will affect the interests of interstate commerce on New York, the Kanawha River, and the Ohio River.

215 (57) In failing to find that the construction and operation of the defendant's project will affect the operation of the navigation locks and dams which the plaintiff has constructed and is constructing on the Kanawha River at London, Marmet, and Winfield, on the Ohio River at Gallipolis, below the mouth of the Kanawha River, and the existing dams on the Ohio River below the Gallipolis dam and that the plaintiff will be put to addi-

tional expense in operating its said locks and dams to the detriment and damage of the plaintiff.

(58) In failing to find that the construction and operation of the defendant's project will materially alter the flow of the New River at its mouth and hence will affect the operation of the hydroelectric power plants which have been constructed with the consent of the plaintiff at its dams at London, Marmet, and Winfield on the Kanawha River, and that the revenue which the plaintiff receives from the lease of such power plants may be materially affected by such change in the flow of the Kanawha River.

(59) In failing to find that the plaintiff is entitled to an injunction under the Act of Congress of March 3, 1899, when it appears that the construction and operation of the defendant's project will obstruct the navigable capacity of navigable waters of the United States, or will alter or modify the condition and capacity of the channel of navigable waters of the United States.

(60) In failing to find that the Act of Congress of March 3, 1899, requires the consent of the United States for construction and operation of the defendant's project and that such consent of the United States may be given by the Federal Power Commission through the issuance of a license under the Federal Power Act.

(61) In failing to find that New River at the site of the defendant's project is a stream over which Congress has jurisdiction under its authority to regulate commerce with foreign nations and among the several states; and that the defendant's project will have hydraulic machinery and a storage reservoir of sufficient size

to completely control the flow of New River past the dam
216 for indefinite periods during time of low or moderate flow;

that the control which the defendant may thus exercise over the flow of New River will affect the interests of interstate commerce; that the defendant filed a declaration of its intention under Section 23 of the Federal Power Act to construct this project and the Commission found that the interests of interstate commerce would be affected by such proposed construction, and that construction and operation of the defendant's project without a license would be in violation of the terms of Section 23 of the Federal Power Act, and that construction and operation of the defendant's project may be enjoined under the provisions of the Federal Power Act.

(62) In failing to find that so far as the interests of navigation are concerned periods of low and moderate flow are critical and that during such periods a portion of the New Kanawha watershed lying above the defendant's dam is more productive of run-off than the portion of such watershed lying below such dam, and therefore the upper portion is of greater importance to navigation

interests on New River, on the Kanawha River, and on the Ohio River.

(63) In failing to specify what conditions in the license tendered by the Federal Power Commission are not authorized by the Federal Power Act and what conditions in the license tendered by the Federal Power Commission are not constitutional and valid.

(64) In failing to find that the flow of New River from above the defendant's project furnishes a large proportion of the flow of the Kanawha River at the head of navigation thereon and that during dry periods has contributed as high as 70 percent of the flow of the Kanawha River at its mouth, and that the flow of New River from above the defendant's project has furnished during low-water periods, as high as 32 percent of the flow of the Ohio River below the mouth of the Kanawha River.

(65) In failing to find that control by the United States over the flow of New River at the site of the defendant's project is necessary to insure maintenance of the navigable capacity
217 of navigable waters of the United States, namely: New River, the Kanawha River, and the Ohio River.

(66) In finding that the average flow of New River at the site of the defendant's project is around 3,211 cubic feet per second (R. —), but in failing to find that the flow at this place is less than this average for 65 percent of the time; in failing to find that during low-water periods from 30 percent to 70 percent of the flow of the Kanawha River at its mouth comes from the New River above the site of the defendant's project; that during the low-water periods the New River above the site of the defendant's project has contributed as much as 32 percent of the flow of the Ohio River below the mouth of the Kanawha River, and that the flow of New River at the site of the defendant's project is essential for the maintenance of the navigable capacity of the Kanawha River and the Ohio River.

(67) In finding that the defendant proposes to install electric generating machinery in its project with hydraulic machinery capable of passing 9,000 cubic feet of water per second when in full operation, and that the reservoir in the defendant's project will have a usable capacity of 100,000 acre-feet (R. —); but in failing to find that this usable capacity is sufficient to enable the defendant to operate its power plant, particularly during periods of low and moderate flow in an irregular manner, so as to discharge past the dam varying flows ranging from a complete shut-off at the dam to a release of as high as 9,000 cubic feet per second or more, and that this irregular operation can occur during such periods as the flow of New River into the reservoir in the defendant's project is less than 9,000 cubic feet per second; that the flow of New River into the reservoir in the defendant's project

will be less than 9,000 cubic feet per second for over 96 percent of the time and that the flow has been 3,000 cubic feet per second or more for only 141 days a year during the years of record.

(68) In failing to find that although only 29 percent of the drainage area above Kanawha Falls lies above the defendant's dam site, during periods of low and moderate flow the part
218 of the New-Kanawha watershed lying above the defendant's dam is more productive of run-off than the part of said watershed below said dam site, and that the periods of low and moderate flow are critical periods so far as navigation interests are concerned.

(69) In failing to find that the usable storage capacity of the defendant's reservoir is sufficient in periods of low and moderate flow to permit the defendant to impound the entire flow of the river continuously for many days.

(70) In failing to find that the defendant's project, if not under license of and controlled by the United States, is not adapted to the plans of the United States for the comprehensive development of the New-Kanawha River system and for the development of navigation, flood control, prevention of soil erosion, development of water power, and other public uses on said stream system, in that it will alternately and periodically and for a large part of the time restrain the full flow of New River and release damaging waves of water and will withhold the flow of New River in its reservoir; that the defendant seeks to avoid the requirement in the Federal Power Act that it shall contribute in proportion to its benefits toward the construction of headwater improvements considered in the comprehensive plan of the United States and contemplated by the Federal Power Act; and that, in so far as the operation of the defendant's project will be intermittent or inconsistent and not coordinated with other projects and developments under the control of the United States, it will interfere with existent and prospective commerce on New River, on the Kanawha River and on the Ohio River, and with the operation of the works constructed by the United States for the purpose of improving navigation on said streams.

(71) In failing to find that construction and operation of the defendant's project, if not under license of and controlled by the United States, will interfere with the reforestation and soil conservation program of the United States for the protection of the watershed of navigable streams, which program has been proceeding under the so-called Weeks Act approved March 1, 1911,
219 36 Stat. 961, and other acts of Congress, and more particularly through the purchase of large areas of lands in the Unaka National Forest and in the Monongahela National Forest within the New River watershed.

(72) In failing to find that the power and authority of the United States over interstate and foreign commerce extends to the flow of all navigable waters of the United States and to all acts wherever performed or however done which may reasonably relate to or affect the flow of such navigable waters; that the United States may grant or withhold its consent for the erection of structures in nonnavigable tributaries of navigable waters of the United States, which structures may be used or operated to alter, modify, or obstruct the course, condition, or capacity of such navigable waters or structures in such nonnavigable tributaries as will affect the interests of interstate commerce or navigable waters of the United States; and that in nonnavigable tributaries the flow of which is essential to the maintenance of navigation on navigable waters of the United States the erection of structures which will alter, modify, or obstruct the course, condition, and capacity of navigable waters of the United States or structures which will affect the interests of interstate commerce on navigable waters of the United States, where such structures are erected without the consent of the United States are unlawful and their construction and operation may be enjoined.

(73) In failing to find that the defendant's project is being constructed on a stream at a site where the flow is essential to the maintenance of navigable capacity of navigable waters of the United States, namely: the navigable New River, Kanawha River, and Ohio River.

(74) In failing to find that the defendant's project will alter, modify, and obstruct the flow of the New River and in turn the navigable capacity and the flow of the lower New River, the Kanawha River, and the Ohio River.

(75) In failing to find that the defendant's project will alter, modify, and obstruct the flow of the New River and in turn will affect the interests of interstate commerce on New River, the Kanawha River, and the Ohio River.

220 (76) In refusing to admit evidence offered on behalf of the plaintiff as follows:

Q. (By Mr. McCLERNAN.) Did you ever make any experiments in order to determine the persistence of power-plant waves, such as these we have been discussing?

A. (Mr. KRAMER.) I have observed waves created by power plants, at my request.

Q. Where did you do that?

A. The first case was on the Pit and Sacramento Rivers in California, in 1925. Also on the Klamath River in California, 1927 and 1935.

By Mr. McCLERNAN. Now I propose to ask the witness for the result of his experiments.

By the COURT. I don't believe I can allow you to do that.

By Mr. MCCLERNAN. Exception.

Offer of proof. By Mr. MCCLERNAN. The Government now offers to prove by the witness on the stand that as a result of his observations on the Pit and Sacramento Rivers in 1925, he found that waves created at the Pit-3 Power Plant, already mentioned in the witness' testimony, persisted below the point of generation to a substantial degree for a distance of 128 miles, namely, to the Red Bluff Gage, and further offers to prove by the same witness that while the Pit and Sacramento Rivers are not in every respect comparable to the New and Kanawha Rivers, there are substantial stretches in the Pit and Sacramento Rivers that are substantially comparable to like substantial stretches in the New and Kanawha Rivers and sufficiently so to enable an experienced hydraulic engineer to form a reliable opinion from observation such as were made by this witness on the Pit and Sacramento concerning what would be the distance and degree of persistence of similar waves on the New and Kanawha Rivers.

Defendant's objection to the offer of proof was sustained and exception duly entered (R. —).

(77) In refusing to admit evidence offered on behalf of the plaintiff as follows:

By Mr. MCCLERNAN. For the purposes of the record I now offer to prove by this witness (Mr. Kramer) the results of his observations made on the Klamath River, particularly with reference to the distances of the persistence downstream of the power waves observed.

The defendant's objection having been sustained, plaintiff duly excepted and made the following offer of proof:

The Government offers to prove by the witness on the stand that as a result of his observations on the Klamath River in 1927, he found that the waves created at the Copco Power Plant,
221 located on the Klamath River about 198 miles above its mouth, already mentioned in the witness' testimony, persisted below the point of generation to a substantial degree, for a distance of 183 miles, namely to the Somes Bar Gage, and further offers to prove by the same witness that while the Klamath River is not in every respect comparable to the New and Kanawha Rivers, there are substantial stretches in the Klamath River that are substantially comparable to like substantial stretches in the New and Kanawha Rivers and sufficiently so to enable a hydraulic engineer to form a reliable opinion from observations such as were made by this witness on the Klamath River concerning what would be the distance and degree of persistence of similar waves on the New and Kanawha Rivers.

The defendant's objection to the offer of proof having been sustained, the plaintiff duly excepted.

By Mr. McCLERNAN. The Government now offers to prove by the witness on the stand that as the result of his observations on the Klamath River in 1935, he found that the waves created at the Copco Power Plant located on the Klamath River about 198 miles above its mouth, already mentioned in the witness' testimony, persisted below the point of generation to a substantial degree for a distance of 198 miles, namely, to the Requa Gage and further offers to prove by the same witness that while the Klamath River is not in every respect comparable to the New and Kanawha Rivers, there are substantial stretches in the Klamath River that are substantially comparable to like substantial stretches in the New and Kanawha Rivers and sufficiently so to enable a hydraulic engineer to form a reliable opinion from observations such as were made by this witness on the Klamath River concerning what would be the distance and degree of persistence of similar waves on the New and Kanawha Rivers.

The defendant's objection to the offer of proof having been sustained, the plaintiff duly excepted.

(78) In refusing to admit as substantive evidence plaintiff's exhibits numbered for identification 95, 103, 104, and 105, the same being documentary reports of plaintiff's witness Kramer relating to power-wave action on the Pit and Klamath Rivers;

(79) In refusing to admit evidence offered on behalf of the plaintiff as follows:

Q. (By Mr. THOMPSON.) Now, Mr. Sherman, under the Weeks Act, has there been a purchase of any lands in the State of Virginia and West Virginia?

Objection by Mr. Jackson.

By the COURT. The objection will be sustained. You may avow what you expect to prove by the witness.

By Mr. THOMPSON. If the Court please, we offer the testimony by the witness E. A. Sherman for five purposes:

1. To show that the land purchased under the Weeks Act by the Federal Government in the past, present, and future, will restore stream flow in the New River, improve stream
222 flow in the Kanawha River, improve the New River and the Kanawha River for navigation and make the New River susceptible for improvements in its navigable capacity.

2. That the reforestation of the lands purchased in the past on the headwaters of the New River, being purchased at the present time and proposed for purchase in the future, will, when purchased, hold back the run-off from the New River watershed letting it return into the channel of New River gradually, so that

in low water times it will improve the navigable depth of New River over its shoals for navigable purposes.

3. That Congress having from 1876 to 1886 appropriated one hundred and twelve thousand dollars to improve navigation conditions of New River, with approximately one hundred and nine thousand dollars of that sum having been spent by Congress in improving the channel in New River for navigation.

That Congress, by its purchases in the past, at this time, and as the agricultural department proposes to purchase forest areas on the watershed of New River for reforestation, is showing by these acts that Congress is desirous of improving the navigable capacity of New River and of making the navigable capacity of New River more susceptible for improvements, and is seeking and by this act is indicated that Congress has not abandoned the navigable capacity of New River for improvements.

4. That by the purchase of forest lands for reforestation on the head waters of New River, Congress is seeking to carry out flood-control programs on the Mississippi River, and its tributaries, including the Ohio River, the Kanawha and the New Rivers, in order that in flood times these reforestative areas will hold back sudden run-off and thus assist in preventing floods on New River, Ohio River, Kanawha River, and the Mississippi River.

5. To further sustain, on the part of the plaintiff, the issues in this case as made by the pleadings herein, to this end we offer by this witness to prove that Congress appropriated in 1912, and the Department of Agriculture has expended from that time, monies for the purchase of land to be reforestated, located on the upper reaches of New River, in what is termed Unaka National Forest.

(Other related subjects proposed to be covered by the testimony of this witness as avowed by Mr. Thompson are not reproduced herein due to the length of same.)

By Mr. THOMPSON. I understand then that you rule against the admission or the offer of any testimony further by this witness.

The COURT. I think so.

Mr. THOMPSON. Exception.

(80) In refusing to admit as substantive evidence plaintiff's Exhibit No. 94, a documentary report of Colonel Tripp relative to the effect of the operation of defendant's Radford project.

223 (81) In refusing to admit on behalf of plaintiff exhibit market for identification No. 270, the same being a report signed by Major Ardery relating to the effect of power waves on the New and Kanawha Rivers.

Wherefore the plaintiff prays that the decree aforesaid may be reversed and for such other and further relief as to the Court may seem just and proper.

(Signed) JOSEPH H. CHITWOOD,
United States Attorney,
(Signed) JOHN W. AIKEN,
Special Assistant to the Attorney General,
(Signed) WILLARD W. GATCHELL,
Attorney, Federal Power Commission,
Solicitors for Appellant.

224 In United States District Court

[Title omitted.]

Order extending time for transcript of record

Good cause appearing therefor and upon motion of solicitors of record for the appellant herein, it is hereby ordered by the undersigned, the Judge who signed the order allowing the appeal and issued the citation herein, that the appellant be and it is hereby granted until the 10th day of November 1938, within which to file the certified copy of the record on appeal herein in the office of the United States Circuit Court of Appeals for the Fourth Circuit.

Dated at Roanoke, Virginia, this 29th day of July 1938.

(Sgd.) JOHN PAUL,
United States District Judge.

225 In United States District Court

[Title omitted.]

Order extending time for transcript of record

Filed Sept. 15, 1938

An appeal to the Circuit Court of Appeals for the Fourth Circuit having been allowed in this case upon petition of Appellant on the 29th day of July 1938, at which time, due to the great length of the record made in the trial of the case, and upon request of counsel for both Appellant and Appellee, the time for filing the record on appeal was extended to the 10th day of November 1938.

And it now appearing to the Court that a further extension of the time within which to file the record on appeal is necessary.

And it further appearing that in the preparation of the record on appeal both Appellant and Appellee have been conforming to the Equity Rules now in effect, as distinguished from the Rules of Civil Procedure to become effective on the 16th day of September 1938.

It is therefore found by the Court that in the preparation of the record on appeal in this case it is not feasible for the parties to follow the said Rules of Civil Procedure becoming effective on September 16, 1938, and it is so ordered.

It is further ordered that the time for filing the
226 record on appeal in the Circuit Court of Appeals be and the same is hereby extended from November 10, 1938, to December 15, 1938.

Given under my hand this 15th day of September 1938.

(Sgd.) JOHN PAUL,
United States District Judge

227 In United States District Court

[Title omitted.]

Order enlarging time for filing appellee's amendments to the statement of evidence and enlarging time to file record on appeal

Entered Nov. 30, 1938

This day came the appellee by counsel and filed its written motion for an enlargement of time for filing its amendments to the statement of evidence as lodged by the appellant, on November 17, 1938, and for an enlargement of time for filing the record on appeal in the Circuit Court of Appeals.

In consideration whereof it is adjudged, ordered, and decreed that the time for filing the appellee's amendments to the statement of evidence as lodged be and it hereby is enlarged up to and including the 10th day of January 1939, and it is further adjudged, ordered, and decreed that the time for filing the record on appeal is enlarged up to and including the 25th day of January 1939.

Given under my hand this 30th day of November 1938.

JOHN PAUL,
Judge of the District Court of the United States for the Western District of Virginia.

By Consent.

JOHN W. AIKEN,
WILLARD W. GATCHELL,
Solicitors for Appellant.

228 In United States District Court

[Title omitted.]

Order enlarging time for filing appellee's amendments to the statement of evidence and enlarging time to file record on appeal

Entered Dec. 21, 1938

This day came the appellee by counsel and filed its written motion for an enlargement of time for filing its amendments to the statement of evidence as lodged by the appellant, on November 17, 1938, and for an enlargement of time for filing the record on appeal in the Circuit Court of Appeals.

In consideration whereof it is adjudged, ordered, and decreed that the time for filing the appellee's amendments to the statement of evidence as lodged be and it hereby is enlarged up to and including the 1st day of February 1939, and it is further adjudged, ordered, and decreed that the time for filing the record on appeal is enlarged up to and including the 15th day of February 1939.

Given under my hand this 21st day of December 1938.

JOHN PAUL,
Judge of the District Court of the United States for the Western District of Virginia.

By consent.

JOHN W. AIKEN,
WILLARD W. GATCHELL,
Solicitors for Appellant.

229 In United States District Court

[Title omitted.]

Order extending time

The appellee, Appalachian Electric Power Company, on yesterday, the 1st day of February 1939, having duly presented and filed its amendments and objections to the appellant's statement of the evidence pursuant to the Equity Rule and the order extending the time for such filing heretofore duly entered, and said amendments and objections having been modified or amended by agreement of the parties: upon consideration thereof, the court, being now of opinion that the amendments and objec-

tions suggested, as so modified, are well taken, doth so adjudge and order, and,

(1) The appellant is directed to make such changes, additions, and corrections in its statement of the evidence as to embody the said amendments and objections, as so modified, and to present the statement of the evidence, so changed and corrected, to the Judge of this Court on or before the 24 day of February 1939, for approval and authentication.

(2) It is further ordered that the time for filing the Transcript of Record on appeal in the Office of the Clerk of the Circuit Court of Appeals for the Fourth Circuit be, and it hereby is, extended to the 1st day of March 1939.

February 2, 1939.

(Sgd.) JOHN PAUL,
Judge of the District Court of the
United States for the Western District of Virginia.

230 In United States District Court

[Title omitted.]

Order extending time

It is ordered that the time within which the record in this cause on appeal to the Circuit Court of Appeals for the Fourth Circuit may be filed in the Clerk's Office of said Court be, and the same is hereby, extended until the 15th day of March 1939.

(Sgd.) JOHN PAUL,
United States District Judge.

231 In United States District Court

[Title omitted.]
[File endorsement omitted.]

Stipulation as to printing record under rule 23

Filed Nov. 17, 1938

It is hereby stipulated and agreed that the Clerk of the District Court shall make up a transcript of the record on appeal in the above-styled cause and transmit the same to the clerk of the United States Circuit Court of Appeals for the Fourth Circuit at Richmond, Virginia, and that the record on appeal shall be

printed under the supervision of the Clerk of the Circuit Court in accordance with Rule 23.

This 17th day of November 1938.

(Sgd.) JOHN W. AIKEN,
John W. Aiken,
Special Assistant to the Attorney General,
(Sgd.) WILLARD W. GATCHELL,
Willard W. Gatchell,
Principal Attorney, Federal Power Commission,
Solicitors for Appellant.
(Sgd.) WENDELL W. FORBES,
Solicitor for Appellee.

232 In United States District Court

[Title omitted.]

[File endorsement omitted.]

Stipulation re original exhibits

Filed Nov. 17, 1938

It is stipulated by the parties hereto that all original exhibits filed in the District Court during the trial of this cause, or such copies of originals as may have been substituted therefor by leave of the Court, shall constitute a part of the statement of evidence to be filed by the appellant under Equity Rule 75, but neither party shall be deemed to have waived any objection as to the admissibility or materiality of any exhibits by force of this stipulation; nor does either party hereby concede the propriety of inserting in the statement of evidence the objections and exceptions of the other party.

It is further stipulated that copies of said exhibits need not be attached to appellant's statement of evidence but that said original exhibits shall be and they are, by reference thereto, hereby made a part of the statement of evidence.

The Clerk of the District Court is requested to send up to the Circuit Court of Appeals all of the original exhibits as a part of the statement of evidence and a part of the record on appeal.

This 17th day of November 1938.

JOHN W. AIKEN,
Special Assistant to the Attorney General,
WILLARD W. GATCHELL,
Principal Attorney, Federal Power Commission,
Counsel for Appellant.
WENDELL W. FORBES,
Counsel for Appellee.

233 In United States District Court

[Title omitted.]

Order re transmittal of original exhibits

Entered Feb. 2, 1939

Pursuant to stipulation heretofore entered into between counsel for the parties, it is adjudged and ordered that all original exhibits, which are not copied in full in the statement of the evidence to be filed in this case be, and they hereby are, made a part of the transcript of the evidence and are hereby directed to be transmitted by the Clerk of this Court, after duly identifying each such exhibit individually, to the Clerk of the Circuit Court of Appeals of the United States for the Fourth Circuit, along with the certified transcript of the record.

February 2, 1939.

(Signed) JOHN PAUL,
Judge of the District Court of the United States for the Western District of Virginia.

234 In United States District Court

[Title omitted.]

Order approving statement of evidence

Feb. 24, 1939

It appearing to the Court that the foregoing statement of the evidence contained within fourteen volumes of testimony—pages 1 to 2649, inclusive—and five volumes of exhibits—pages 2650 to 3405–D, inclusive—is true, complete, and properly prepared and, together with the original exhibits hereinafter enumerated, includes all the evidence necessary for a decision of the questions presented by the appeal, the same is hereby approved and ordered filed as a statement of the evidence to be included in the record on appeal in the above-styled cause, all as provided for in Equity Rule 75.

The original exhibits hereinbefore referred to are numbers 1–13, incl.; 32; 39; 43; 47–87, incl.; 89; 90; 90–A; 95; 97; 105; 106; 106–A; 106–C; 107–116, incl.; 117A–117F, incl.; 158–161, incl.; 163–189, incl.; 189–A; 190–200, incl.; 200–A; 200–B; 201–205, incl.; 207–221, incl.; 221A–221E, incl.; 223; 226–229, incl.; 229–A; 230; 230–A; 231–238, incl.; 240–252, incl.;
235 118–123, incl.; 123–A; 132–141, incl.; 143–156, incl.; 500–

507, incl.; 509–517, incl.; 519–526, incl.; 534; 536; 539–A; 540–A; 540–B; 543; 544; 549–557, incl.; 558A–558C, incl.; 561–563, incl.; 567; 254–261, incl.; 264A–264C, incl.; 265; 266; 271–275, incl.; 569; 572; 573; 574–C; 575; 576; 578–A; 578–B; 580; 584; 585; 589–592, incl.; 599–608, incl.; 610.

This 24th day of February 1939.

(Sgd.) JOHN PAUL,
United States District Judge.

Memorandum by the Clerk: The following original Exhibits, required by the foregoing order to be certified up, viz: Exhibit No. 230; Exhibit No. 249; Exhibit No. 250; Exhibit No. 251; Exhibit No. 252; Exhibit No. 265; Exhibit No. 500; Exhibit No. 501; Exhibit No. 502; Exhibit No. 503; Exhibit No. 504; Exhibit No. 512; Exhibit No. 519; Exhibit No. 521; Exhibit No. 576; Exhibit No. 604; Exhibit No. 605; Exhibit No. 606; Exhibit No. 608; are missing from the papers in the record and therefore the order cannot now be complied with as to them. However, as it is thought that copies will be supplied by counsel before the hearing, these Exhibits are carried in the index.

C. E. GENTRY, *Clerk.*

236 In United States District Court for the Western District of Virginia

In Equity No. 8

UNITED STATES OF AMERICA, PLAINTIFF

vs.

APPALACHIAN ELECTRIC POWER COMPANY, A CORPORATION, DEFENDANT

Statement of evidence under equity rule 75

Be it remembered that the above entitled case came on regularly for trial before the above Court sitting in equity on the 13th day of July 1936 upon the issues formed by the bill of complaint as amended and the answer thereto as amended. The hearing was concluded September 5, 1936.

Both plaintiff and defendant offered oral testimony and introduced documentary evidence as hereinafter appears.

Appearing as counsel for the plaintiff were Messrs. Huston Thompson, Wayne C. Williams, Allan D. Jones, Henry McLernan, and John W. Aiken, Special Assistants to the Attorney General; Oswald Ryan, General Counsel, and Willard W. Gatchell, Attorney, Federal Power Commission; John A. Skiles,

Special Attorney, Department of Justice; and J. H. Chitwood, United States Attorney. Appearing as counsel for the defendant were Messrs. Newton D. Baker, Raymond T. Jackson, John L. Abbot, Fraser M. Horn, Wendell W. Forbes, M. W. Belcher, Jr., John S. Draper, and Wallace Ould.

237 *Section 1. Plaintiff's Main Case*

FRED D. BRADFORD testified upon Direct Examination as follows:

I am Chief Draftsman of the Federal Power Commission at Washington, D. C.

The map marked for identification, plaintiff's "Exhibit 1" is a map which I prepared of the New and Kanawha Rivers from the United States Geological Survey maps. The heavy line running through the middle of the map is New River greatly enlarged in order to make the river stand out conspicuously. (Map filed and marked "Exhibit 1".[2] Said exhibit was offered[3] and received in evidence for the limited purpose of giving a general picture of New River which might be useful to the witnesses in connection with their testimony and to the court in understanding it, but not as proof of any of the physical locations or characterizations shown on said map. The rest of the map is drawn to an approximate scale. The increase in the width of the New River and the Kanawha River, on this map, runs all the way from the Ohio down to the mouth of Wilson Creek approximately on the map. It is proportioned generally all the way through so as to make it stand out at a distance, but no measurements are placed on it. The same width of the river has been preserved all the way through approximately. Feet and inches do not enter into a map of this class.

The railroads are still farther away from the river than is actually shown on the map. Its scale is about 2½ miles to the inch.

LEWIS HARVEY testified upon Direct Examination as follows:

238 I live in the City of Radford, Virginia, on New River. I was born and raised in Montgomery County within a mile or two of the dam project at Radford. I am 75 years old and have lived on or near the New River all my life. I operate a farm six miles up the river right at this project.

I have seen boats all up and down the New River, mostly back fifty years ago. These were of different makes, some of them

[2] Plaintiff's or Government's exhibits are herein designated by the numbers from 1 to 275 and Defendant's exhibits are designated by the numbers from 500 to 611.

[3] Hereafter when it is stated that an exhibit was "offered in evidence" it means that such exhibit "was offered and received in evidence" unless otherwise indicated.

keel bottoms, some flat bottoms, and some crude boats made and operated by the farmers. These boats carried commerce, bringing down New River all the grain, bacon, lumber, pig iron, and promiscuous stuff that came from way up the New River, which was the only source of outlet we had fifty years ago. At that time we had no roads.

Q. How frequently would you see boats going up and down that river?

A. Pretty much every day.

The boats were of various lengths, sizes, and capacities. Some had two men and others had four men on them. They were propelled with a pole. In going down stream one man stood in front and steered the boat and the other one was behind. These boats ran fifty to seventy-five feet in length; some were eight feet wide, and some were larger. Some of them drew four feet of water.

Q. How long did you continue to see boats going up and down this river?

A. They haven't been used much in the last decade you might say. As we got better roads and railroads and other things, of course, this traffic lessened.

Q. Do you know or can you give the name of any boat man who used to be on that river?

A. If I had time to figure it out, I might, but I just couldn't give it to you just off handed.

I did not do any shipping myself on any of these boats. The Norfolk and Western Railroad came to Radford about the time of the beginning of the Civil War.

There was a mill called General Wharton's Mill across the river from Radford. This mill was the shipping point for boats for all of that country. It was a flour mill, a merchant
239 mill of about fifty-barrel capacity, run by water power.

Nearly every boat which came down the river stopped at the mill at Radford across the bridge from the Norfolk and Western. My farm is right between the mouth of Little River and New River, about a mile from the property of the Appalachian Electric Power Company.

All the timber above that country for miles and miles was rafted down the river.

Q. State whether or not any of it passed where the Radford project is located?

A. Yes, sir; it all had to come through there.

I have seen logs and all manner of stuff floating down the river. New River Depot was a shipping point. There was a sawmill there at which the logs were sawed and made into merchandise.

Q. Over how long a period did you see these boats coming down and up the river?

A. I just don't know how to answer that question. All my boyhood days and up until most of my young life we lived on the river, and there was a lot of traffic of all sorts went on, but I just couldn't tell you about any dates.

I should say that these boats came up and down the river for some thirty years.

Upon Cross-Examination the witness testified as follows:

I was born in Montgomery County 76 years ago last March, about a mile or two from New River, in a straight line and five or six miles from there by road. Boats were going up and down the river daily for a period of thirty years. I didn't go to the river every day. I couldn't say how often I went to the river.

Q. Do you mean to tell his Honor that all the iron from the Mack's Creek furnace was boated down the river?

A. No, sir; I wouldn't say all.

Q. Well, how much?

A. I couldn't answer that.

240 Q. Did you ever see any iron boated down the river from the Mack's Creek Furnace?

A. Yes, sir.

Q. Where were you?

A. I was along the river.

Q. Were you at the Mack's Creek Furnace?

A. No, sir.

Q. Did you ever come down from Mack's Creek Furnace to Radford or New River bridge on a boat loaded with iron?

A. No, sir.

Q. How many boats loaded with pig iron did you ever see unload at Radford?

A. I couldn't answer that question because I wasn't interested in that and consequently I don't know.

Q. I believe you said you never used New River for shipping purposes?

A. No, sir.

The general source of the old road in my neighborhood called the Lead Mines Road is west after it leaves Snowville. It goes to Mack's Creek furnace, which was a sort of junction point because during the Civil War they made iron at this place and supplied the Confederacy with iron from this furnace and the mail route from Christiansburg went there.

Q. Do you assume to tell the Court that the Mack's Creek Furnace was ope..ted during the war?

A. Yes, sir.

Q. You do state definitely and positively that the Mack's Creek Furnace, or Radford Furnace, was operated during the Civil War?

A. No, sir; I don't.

Q. You just said that a minute ago?

A. Yes; I might have said that, but I don't believe a man should be too positive about anything. I am here to tell you the truth as far as I know it.

Q. Do you mean to say then that the Mack's Creek Furnace, or Radford Furnace, was not operated during the Civil War?

241 A. I understand it was. For instance, I was only five years old at Lee's surrender, and of course my memory don't date back very far, you see.

Q. So, of course, you don't know how the iron was taken away from there?

A. I know a lot of it came down the river, but I couldn't tell you how much.

Some of these boats drew four feet of water, I think; I did not ride on them.

I have forded New River on horesback as a young man. We would jump on a horse and cross it anywhere. There is a ford near Ingle's Falls, and also at Howe's Fall, about two miles above this dam project. I was about the river every day or every few days.

Pig iron is a chunk about eighteen inches long [indicating] and weighing about one hundred pounds. Some pigs were four inches in diameter and some were six. We saw the pig iron in these boats where it was unloaded and loaded in box cars on the railroad. I saw pig iron stacked at New River bridge, which was the shipping point, but saw pig iron everywhere. They told me it was pig iron. I don't know that I saw the pigs actually unloaded at New River from the boats.

By the COURT:

Q. How did they get these keel-bottom boats back up the river?

A. A keel bottom will carry 150 bushels of wheat and two men could guide them down the river, but it took four men to take them back. They put the poles against their shoulders, two on each side, and they polled them up.

Q. I understood you to say they were 70 or 80 feet long?

A. They were.

Q. And did they pole them back up the river?

A. Yes, sir; two men to the side. Two brought them down and four took them back; it took two to the side.

J. W. FLANNAGAN testified upon direct examination as follows:

I have lived at Radford, Virginia, on New River, about
242 thirty years, and am 68 years old. I was born and raised on New River about five or six miles below Radford.

I have seen quite a few keel-bottom boats on New River but not many flat-bottom boats. The keel-bottom boats plied up and down the river, down as far as Hinton and back up to Allisonia and throughout that country. I was raised near Pepper's Ferry and saw these boats going up and down the river on what is called the "Horseshoe," the bend in the river. The farm on which I was born was about three hundred yards from the river and I lived there for thirty-three years.

Q. State whether or not you saw boats going up and down the river during those 33 years?

A. Yes, sir.

Q. What were these boats doing, going up and down the river?

A. They were hauling lumber, wheat, corn, groceries of all descriptions, and lumber and crossties.

Q. Did any of those boats stop at your farm?

A. Yes, sir; they often stopped there. There was one crew on these boats that lived right back of our farm.

Q. And when they would stop there, did you ever see the boats?

A. Yes, sir; I would see them. I was a little fellow—I was not more than 12 years old.

Q. How would you know when the boats were coming?

A. I would hear them sound the bugle horn. They would get to what was known as Barnett's Falls, and there was a swift current there and, unless they used poles, they could not pole through there, and they would stir around there for quite a bit, and so when it went to go through there, they would blow the horn, and I was a little fellow, and I was listening for the horn and, when I heard it, I would go get my hat and go down to the river and see them.

Q. How frequently did these boats appear on the river, so far as you know?

A. I could not tell you about that—very often. They usually went as far as Hinton, and they would stay on a trip there for a
week before they would get back, and sometimes, if the
243 river got up, they would have to stay longer, just according to the water that was in the river.

Allisonia is located on the North Carolina branch. My father owned a farm there but I was never on it. I remember that he sawed quite a lot of fencing plank and two-by-fours and siding plank and shipped them on boats down home to our farms to use.

I have seen pig iron unloaded from boats in New River. It was put on the bank near the Norfolk and Western Railroad

station on New River and transferred onto the Norfolk and Western freight cars.

I recall the Federal Government doing work on the channel of the New River south of Newbern, east of Pulaski, and not very far from Pulaski, when I was about twelve years old. The work included blasting and clearing of the channel.

There were boats on the river both before and after this work was done. There were no railroads and the roads were bad so that pig iron was often loaded in boats and shipped down New River on keel-bottom boats. I know the names of some of the boat crews. One boat crew lived close back of our farm. Their names were Myers—Chapman and Bill.

The witness on cross-examination testified as follows:

I should say that I have seen from one to as many as four or five keel-bottom boats on New River at the same time. I am positive that I have seen as many as three boats on the river at one time but would not say positively that I have seen as many as four at one time.

Q. You have seen more than two on the river at the same time, have you?

A. Yes, sir.

Q. Do you remember testifying in Radford some months ago, when you were called by the Government and gave your deposition in this case?

A. Yes, sir.

Q. I asked you, on cross-examination, in those depositions at page 398: "How many boats did you see on the river at the same time"; and your answer was: "Well, I would say two." Is that correct?

A. It is; yes, sir. These boats would come kind of together as much as they could, and some of them would be, I would
244 imagine, more than two.

Q. The question is not what you imagine, Mr. Flannagan, but I am asking you what you saw.

A. I have seen two and three—I will go that far and be positive about that.

Q. So, when you answered the question before, you were giving us, I suppose, then what you thought was correct?

A. Of course; I was just thinking that I had seen boats quite often. Sometimes there might have been more.

Q. The point is this: you said that you had seen as many as two boats on the river at the same time, a few months ago, and you have come here and said that you saw four or five, and later corrected that and said that you saw about two or three, and you are positive of that.

A. Yes, sir.

Q. You said before that you had seen as many as two, and now you say that you have seen as many as how many, and I want you to be positive about it.

A. I will say that I have seen three on there, to be positive. I may have seen more, but that has nothing to do with that part of it.

Q. Then the statement that you made in your deposition was incorrect, was it?

A. How many did I say?

Q. Two.

A. I will say two, now.

Q. You said three awhile ago?

A. I said two or three.

Q. Will you say as many as four?

A. No, sir; I will not say that.

Q. Who was running the three boats?

A. That is a different proposition. They had crews from all up the river, and some of them I didn't know.

Q. Did you see them every day?

A. No, sir; not every day; they did not go by every day.

245 Q. Every time the bugle would blow, you would go and grab your hat and go to the river to see it?

A. Yes, sir; boylike. I fished most of the time on the river and it was quite a sight for me to see the boats and these men poling the boat up and down the river.

Q. You saw them practically every time they passed down, didn't you?

A. Yes, sir; I would; yes, sir.

Q. Did you know who was running the other boat—who the other boatmen were?

A. No, sir; I wouldn't know the boats' crew. They had them scattered up the river all along, and the ones that lived there near home, I knew—such as the Harts and that bunch, and they had others there at different places. There was Lew Smith, an old darky that ran one of the boats, and there was another——

Q. (Interrupting.) Did Lew Smith run on the boat with the Myers?

A. Sometimes, I think, and there was sometimes a white fellow or two. They had to pick them up as they could get them. They were not regular crews.

Q. They were not regular crews?

A. No, sir; I would not say they were. If a man got sick, he would get someone else to go in his place.

Q. Where did Major Kent live, with reference to where you were born?

A. He lived northwest, not very far off.

Q. The boat that you spoke of that Chap and Bill Myers operated, was that Major Kent's boat?

A. I don't know whose it was.

Q. You testified about bringing lumber down from Allisonia?

A. Yes, sir.

Q. Do you recall how much lumber that was?

A. Quite a lot.

Q. Do you recall what your father did with it?

A. He built fences and buildings, and so forth.

246 Q. You say he built buildings; was it more than a barn that he built?

A. I don't know about the barns, but it was 2 by 4's and lumber for the farm; it was general lumber that my father used for sheeting and everything else.

Q. Do you mean that you were on the boat that brought the lumber?

A. I was on the bank. They put the lumber off and they had to haul it away to keep it from washing away. It was put up in our barn lot. As well as I remember, there were three big stacks that were piled up there; I don't know how many thousands of feet, but it was quite a lot.

Q. One boat brought it, did it?

A. Different boats brought it; they could not have hauled it all on one boat; and we had another farm north of Radford and he sent lumber down there on a boat, too. I didn't state that before—I didn't think about it, but that was true. He used a good deal of fence and plank.

Q. Where did you see cross ties on the river?

A. They were going down on the boats; I saw them.

Q. Going down on the boats?

A. Yes, sir.

Q. When you were a boy, you saw them going down on the boats, did you?

A. Yes, sir.

Q. About how old were you when you saw that?

A. I don't know, sir; I could not state that. I didn't know they would ask this. When they had no railroads, they hauled that stuff down on the boats—to build the railroad and the bridge stuff. They didn't have no way of getting it from Hinton on over the Norfolk and Western that way.

Q. Do I understand you to tell His Honor that these bridge timbers and cross ties for the Norfolk and Western Railroad were taken down the river on the river?

A. Some was moved other ways.

247 Q. Did you ever see a bridge timber go down the river for the Norfolk and Western bridges?

A. Yes, sir; they were shipping stuff there all the time.

Q. I am talking about bridge timbers.

A. I saw the lumber on there and it looked like bridge timbers to me.

Q. Do you know that it was bridge timber for the framing of the bridges for the railroad?

A. No, sir.

Q. And it was at the time the railroad was being built that you saw the cross ties you mentioned?

A. Yes, sir.

Q. That were being shipped on *battoes* in the keel boats?

A. Yes, sir; some of them were keel-bottom boats.

Q. When was this?

A. It was lumber for cofferdams and things like that that went down. There was no other mode of transportation to get that lumber there. They had to use it.

Q. There were roads down there, weren't there?

A. Well, there was roads, but you had to go so far back to get to the river again; you had to go miles and miles around.

Q. Don't you know, as a matter of fact, that the supplies for the building of the New River division of the Norfolk and Western Railroad Company were hauled out on the cars—that they laid the track progressively and that the material was taken out on the road?

A. They had to have a place to start with.

Q. They started at New River Bridge, didn't they?

A. Some of them did; yes, sir.

Q. Isn't that where the whole railroad——

A. (Interrupting.) No, sir; the saw mills were along the river there. They would haul that timber and put it in the saw mill and it was put on cars and shipped to where the railroad wanted it.

248 Q. This boating of the lumber and the cross ties that you speak of was between some inaccessible point on New River, and where the railroad or road struck the river?

A. Well, I would say that they brought the lumber where they could get the kind of lumber they wanted in there; when it comes to bridge timbers, this is usually of Georgia pine, and it has got to be brought in, but there was other timber that they was using to put in dams and everything of that kind. I will tell you my experience: I hauled railroad iron to help build the railroad and hauled it across with teams and delivered it at the end of the tunnel; it was not very far up there where it was unloaded. I believe I unloaded it. That was on New River

and we hauled it there and ferried it across at Pepper's Ferry to build the bridges.

Q. You are now speaking of the cut-off from Walton?

A. Yes, sir.

Q. And I believe the bridge goes to the tunnel across the river?

A. Yes, sir.

Q. And there is no road into the tunnel—it is inaccessible?

A. Yes, sir.

Q. And for that reason you hauled your iron to Pepper's Ferry?

A. We hauled stone and iron, too. The river is inaccessible, when it comes to that; it is inaccessible clear to Hinton. You will find places 10 or 15 miles that you cannot go on the side of the river with wagons.

Q. The timber and supplies that you speak of as being sent along the river there, were being carried down there from some inaccessible point to a place where it could be handled?

A. It is this—that lumber, I believe or supposed, was unloaded off the railroad and, after the railroad crossed at New River and was hauled there on boats along down the river. I don't know if Captain Ingles—I think he surveyed that road, but they had to have supplies in there. They run boats up and down the river hauling all that stuff and everything else. You could not get up with a wagon; I am sure you could not.

249 Q. And you were on your place when you saw the boats hauling this material?

A. At different places, I saw it. I have stood on New River, on the bank, and saw the boats coming down and the pig iron was in the bottom of the boat and it was unloaded there.

Q. Did you ever see any pig iron hauled on the river or only unloaded at the bank of the river?

A. I saw the boats come down and run to the bank and unload it, and I happened to be there. We didn't have many stores in the country then, and it was a good way to a store in the country.

Q. When was it that you saw the pig iron unloaded?

A. I don't know.

Q. How many boats did you see unloaded at New River Bridge?

A. I don't know; there were boats that unloaded there; it might have been two or three or one or different numbers.

Q. I am asking you how many boats you saw unload with pig iron at New River Bridge?

A. These boats were coming up there all along. The question of how many were coming there and the ones that I saw unload, I don't know. I have seen them putting it on the bank of the river.

Q. What year was that?

A. I could not tell you; I don't know. I am 68 years old and you take a boy of 12 years old, and a thing like that makes an impression on him that he will never forget. I remember things when I was 12 years old that I cannot remember 12 months ago now.

Q. How old were you when you saw the boats unloaded with pig iron?

A. I was a little bit of a fellow, big enough to go to the store, about 12 or 14 years old.

Q. Did you ever go to Hinton on one of these boats?

A. No, sir.

Q. The statement that you made on direct examination that the boats went to Hinton was based on what people told you, was it?

A. They all told me that it went to Hinton; that is all I
250 know, but they would be gone several days, and it would probably take them nearly a week to make the trip down the river and push these boats back, and sometimes they would have to tie these boats up at Hinton and sometimes they might be gone for probably two weeks before they could get back any more. Freshets on the river made it so they could not bring the boats back.

Q. This is also based on what people told you, is it?

A. I saw it myself. I didn't see them all the way down, but I figured when the boats came back, according to the river. When these Negroes got drowned, that part of the river was up considerably and I knew they were going down on the boat. They went down the river and the river was pretty deep and it was swift and they could not do anything with their poles. They had to lay their poles down and the current of the river was very swift and it shoved it over on the rocks and they could not work off of the rocks. Those rocks were sticking up there, and you can see those rocks at any time there now. That is only a channel there for boats to go through. I have been on New River all my life and I know as much about it as any man in this country. Sometimes the river deposits sand and gravel and rock and these sluices fill up and have to be cleaned out. Sometimes the river will move it over to one side and deposit the rock and gravel and sand on one side and sometimes on the other. When the river gets up, it will move it until the river gets up to the next stage. You cannot figure on that.

Q. The point that I want definitely is: That the statement you made that the boats went to Hinton was a matter of hearsay. It was not something that you know yourself?

A. Those darkies would tell me that they were going to Hinton. I didn't ride on the boat there; I did not have any occa-

sion to do so, but there is no question but that they went to Hinton.

By Mr. ABBOT. If Your Honor please, we move to strike the testimony of this witness as to where the boats went.

By the COURT. What effect will that have?

By Mr. ABBOT. We want to be in the position of not accepting hearsay evidence. That is all.

Q. Let's get it straight where you live. There are two horseshoes below Radford, are there not?

A. No, sir; there is only one that I know of. My brother and myself did own that. I have another brother that lives
251 directly across on the other side. This horse-shoe bend is a bend in the river that runs around in that kind of shape.

Q. Yes, sir.

A. (Continuing.) And it is one of the very best farms, I reckon, on New River; it is supposed to be. What will happen to that farm when you take the water out and it diminishes—you take the water out of the river, what is to become of the fences and the livestock below there—below the dam?

Q. Is that in response to some question that I asked you?

A. I don't know, sir. I just wanted to tell you that we owned that farm, and I lived there all my life, and I want to know what——

Q. (Interrupting.) Is that the farm that you were born on?

A. No, sir; the farm I was born on is across the river on the other side from that.

Q. Where is the old Radford place?

A. It is up the river across down below Radford at Walton.

Q. That is where the river begins to bend, is it?

A. Yes, sir. Radford is built on the Radford land.

Q. Below that farm—where is Rockford?

A. It is right across from Walton, the first bend in the river.

Q. It is the Radford farm, is it?

A. Yes, sir.

Q. Where is Major Kent's farm?

A. Down the river below what we called the Horseshoe, right across the river, only at the lower end of it.

Q. Where is Whitethorne?

A. Right across the river from the Horseshoe.

Q. Right across the river from where you were born?

A. You would have to cross the river twice to get there.

Q. Tha is the Horseshoe that you are talking about at Tom's Creek—Tom's Creek is on the other side of the river?

A. It is according to where you start from.

Q. Where is it with reference to Pepper's Ferry?

A. Well, it is north of Pepper's Ferry.

252 Q. It is down the river?

A. Yes, sir; it is down the river and, down at the Norfolk and Western tunnel, you would have to cross the river, and, if you are going to Whitethorne, you would have to cross the river again to get to Whitethorne. It comes in a perfect bend.

Q. And that is the Horseshoe were you were born?

A. No, sir; I was born on the other side. My father's old home is on the other side—right across the river from the Horseshoe.

Q. Did you testify about some boating from Pepper's Ferry to the mouth of the tunnel on your direct examination?

A. I didn't boat any there. I testified that I hauled a lot of stuff there, either for the railroad or the contractor. I hauled railroad iron down there to build that railroad through the tunnel. They could not get anywhere.

Q. They could not get into that point except by water, could they?

A. I throwed it off up the river and they loaded it on boats and took it down.

Q. You threw it off at Pepper's Ferry.

A. No, sir; I unloaded down near the tunnel.

Q. You unloaded down near the tunnel?

A. Yes, sir; I could not get down there with the wagons. How they got it away, I don't know.

Q. You unloaded it between the mouth of the tunnel and Pepper's Ferry in the flat there?

A. Yes, sir.

Q. How far is it from Pepper's Ferry to the mouth of Pepper's tunnel, by river?

A. I expect it to be—I never surveyed it, but it would be about 2 miles or 2½ miles there.

Q. And so, on that stretch, you assume that this iron was boated?

A. Yes, sir; I unloaded that iron on the Einstein place—the old Cofer place, and they had a commissary there and they could not get the commissary any further down.

253 Q. How far was that beyond the road that crosses at Pepper's Ferry?

A. Which?

Q. The commissary on the Einstein place?

A. I suppose that was 2 miles or 2½ miles.

Q. You think it was 2 or 2½ miles below there?

A. Somewhere along there.

Q. The road that goes through there that goes down to the right wasn't on the river from the Pepper's Ferry road?

A. Down on the left bank is where I hauled this railroad iron for the railroad company.

Q. You hauled it down to the left bank of the river as you look down the river?

A. Yes, sir; as you look down the river. I know that, because I got my finger mashed all to pieces, is the way that I am able to recall it.

T. W. COLEMAN testified on Direct Examination as follows:

I have resided at East Radford for 62 years. My age is 66.

I have seen several boats on New River when I was a boy. They used to come to my father's place which was over in Horse-shoe just across from Radford. It goes right around East Radford and comes back into Pepper's Ferry again. It is downstream from Radford, I believe one-half or three-quarters of a mile to the south of it, when it turns back and then goes to the main Horse-shoe below that.

These boats which I saw were carrying coal downstream. I can't say that I saw anything but coal carried except for one load of lumber which I saw. I was from ten to twelve years old at the time. I should say that I continued to see these boats running for about a year. I don't think it was over a year.

Mack Creek Furnace is something like twelve or fifteen miles above Radford, about a mile up the creek from New River. I have seen Mack Creek Furnace in operation making pig iron. I have seen boats from Mack Creek carrying pig iron which was unloaded at New River and put on the cars of the Norfolk and Western Railroad.

I have run a steamboat on New River from Pepper's
254 Ferry down to what they call Pepper's Tunnel to take stone and supplies for building the cut-off of the Norfolk and Western. I have carried twenty-five tons on this boat and it might carry thirty. The boat carried stone, dynamite, and commissary provisions, and ran back and forth for about two miles. The stone was hauled from a place called Schooler on the Norfolk and Western Railroad on cars and unloaded on wagons and hauled to Pepper's Ferry for use by the railroad.

I couldn't say what the size of the pig iron was which I saw boated to New River depot, as I was just a boy.

I operated the steamboat six or seven months, I judge, in 1900 during a time when they were building a railroad. The steamboat was built by a fellow named Hodge at New River right across from where Radford is now. We floated it down on the water to where I was.

I have seen several little motorboats and taken one to Hinton which belonged to McWane in 1901, I believe. There were three or four of us. I took it by New River all the way down to Hinton from Radford. Indian Creek is at Crump's Bottom, around twenty, or maybe eighteen or twenty miles below Glen Lyn on the river in West Virginia.

Q. Did you ever know of any boat operating between Hinton and Indian Creek, any steamboat or motorboat?

A. They operated that one there a few days—not long.

Q. Who operated it?

A. I stayed down there four or five days and left then and I don't think they kept it there very long.

Q. Why did you stay there?

A. They asked me to stay there.

Q. And you operated the boat while you were there?

A. Yes; I think it was four or five days.

Q. Was this the boat you brought down from Radford?

A. Yes, sir.

Q. This boat was motivated by steam, was it, or gasoline?

A. Gasoline.

Q. How many passengers would this boat carry?

A. Oh, I reckon it was sufficient to carry twenty-five or thirty or something like that.

255 Q. Had you ever been down New River from Radford to Hinton before you took that trip?

A. I have been along there several times but never a boat.

Q. So that you didn't know the channel? The channel was new to you?

A. I didn't know the channel.

Q. Who was the pilot of the boat?

A. We had a fellow on there by the name of Dudley.

Q. You don't know whether he had ever been over it?

A. I know he hadn't.

Q. You know he had not?

A. Yes.

Upon cross-examination the witness testified as follows:

I have seen pig iron hauled down to New River bridge or New River Depot which it was said came from the Mack Creek Furnace. Lots of pig iron was stored there after the furnace went out. I have seen pig iron unloaded but I did not see it come down the river, as far as I know.

I have seen two or three small motor boats on the river. When I saw them they were just running up and down the river, as far up as Towe's Ferry, about eight miles above Radford. I remember I saw one up that far. I never saw one any farther down the river than the one we were taking to Hinton.

I think that it was in the Spring of 1901 that I took this motor boat from Radford. I was accompanied by McWane, a fellow named Dudley, and old man Grayson. Dudley and I were in charge of the boat. I handled the steering wheel part of the way and let Dudley handle it part of the way. It went upstream under its own power and we never had to push it from Hinton up. We had to help it over what they call Bull Falls but we never had to push it up around Radford. It would draw anywhere from eighteen to twenty inches loaded.

I think we had about a five-foot tide and the current was pretty swift in places but we went along smoothly without trouble, starting from Radford between eight and nine in the morning, stopping at Crump's Bottom about five o'clock, and going on to Hinton the next morning, arriving there, I am sure, before twelve o'clock.

256 Q. Did Mr. Grayson and Mr. McWane and Mr. Dudley accompany you from Crump's Bottom on down to Hinton?

A. No; they come back home.

Q. They left you at Crump's Bottom?

A. Yes, sir; they come back home.

Q. So you went on down to Hinton by yourself?

A. Well, they had two fellows here that were going to handle this boat and they got me to stay with it, you know.

Q. They were two new men that hadn't been on before?

A. They was old boatmen, keel-bottom boatmen but they hadn't ever been on a gasoline boat.

Q. What was your destination at Hinton? What were you going to do when you arrived at Hinton?

A. Just hauled eggs and butter and stuff like that from up there.

Q. You mean you picked up a cargo of eggs that morning after you had arrived at Crump's Bottom on the night before?

A. We didn't take much stuff down the first morning.

Q. You say you didn't take very much stuff. You mean you took some eggs, however?

A. Yes; two or three crates of eggs.

Q. You took two or three crates of eggs; and where did you take the eggs?

A. I don't know where they took them. I just went with the boat.

Q. What did you do at Hinton that day?

A. I couldn't tell you that, what I done at Hinton even.

Q. Well, did you see anyone making further trips with the boat? Were you in charge from that point?

A. No; the man that bought the boat was in charge of it and he got me to go there to help break these fellows in.

Q. Who bought the boat?

A. There was a doctor, they told me, bought the boat and that is all I know, from Red Sulphur Springs.

Q. You don't remember his name?

257 A. No; I don't remember his name.

Q. Did you see him?

A. Yes; I saw him.

Q. Can you remember what he looked like? I mean could you describe him?

A. He was a fleshy man. I don't know hardly. I couldn't hardly describe him, but I remember him being a pretty good-sized man. He was as large a man as I am.

We came back up to Crump's Bottom after having landed at Hinton some time on the second day. The following day we went to Hinton and returned to Crump's Bottom that evening, continuing in this way for a period of four or five days.

I think the boat was forty or forty-five feet long and was made on the order of a flat-bottom bateau. Bateaux are keel-bottom boats, that is, they have a keel on top and under the water. Part of the boat where the keel stopped is bound to be flat. This flat part is around five and one-half or six feet wide. The flat part of the bottom of the gasoline boat which I took down to Hinton was at least five feet wide. The top was six inches or a foot wider, so the top of the boat might be six or six and one-half feet wide and the flat part of the boat resting on the water would be something like five feet.

I said I saw pig iron unloaded at New River Depot. That is occasionally during that period of time; as many as four or five, or possibly six, different occasions.

I said we had an uneventful trip from Radford to Hinton—as I recall it a smooth trip and no difficulty. I do recall a little block come loose on the side. All they had to do was slip that back in. I did testify at Radford last February that we had an accident on the trip from Radford to Hinton. I say we just knocked a little block loose on the side, but I did not count that any difficulty to amount to anything—five minutes' work put the block back in place, although we might have been there thirty or forty minutes.

Q. Do you recall that you testified at Hinton last winter that it took you about thirty or forty minutes to fix this boat at Radford?

A. It didn't take us that long.

258 Q. I will read what you said. You were asked how long did that take you, referring to this incident that you have just described, and your answer was "just about thirty

or forty minutes. It was built of blocks set in there and it just shoved one in."

A. That is what it done. It might have been thirty or forty minutes. I don't know because it didn't amount to anything. I know that.

Q. You are under the impression it wasn't a mere five-minute job, aren't you?

A. It oughtn't to take over five minutes. We might have been there thirty or forty minutes.

Q. What was it that knocked this block out?

A. A rock.

Q. There was a rock in the bed of the river?

A. A rock in the channel.

The Hodge boat that I mentioned drew twenty or twenty-five inches of water with a load. Before this boat went down to Pepper Tunnel there was a channel but it was too narrow for the boat and some work was done to widen the channel so the boat could get through. I did not come down on the boat from Radford to Pepper's Ferry. It was not necessary for me to come down because I lived right across the river from Pepper's Ferry.

Q. But the boat itself, in order to come down from Radford to Pepper's Ferry, had to have this channel blasted out?

A. No; it didn't have to have any channel. It just had this channel on account of the load, by loading it down from Pepper's Ferry down where they done the hauling.

Q. You hauled it down light, hauled it to Pepper's Ferry light?

A. Yes; went down light.

Q. I mean so far as you know, it was hauled to Pepper's Ferry light. You didn't see it?

A. I didn't see it but they taken it down there and the engine and everything was put on it after they got down there.

The boat had an engine which I had put on it myself. It was necessary to dig the channel out for the two miles between
259 Pepper's Ferry and Pepper Tunnel before any hauling could be done. Material was ferried from one side of the river to the other, after having been hauled to Pepper's Ferry by wagon. The ferry or this little steamboat received material which had been brought by wagon to Pepper's Ferry and took it two miles across the river to Pepper's Tunnel, which could not have been reached by road because they wouldn't let anyone go through the farm.

The witness testified on Redirect Examination as follows:

This was not a ferry boat. I had not known of loads of from twenty to thirty tons being hauled down that channel before.

The channel was made for keel-bottom boats and was not as wide as this boat which had a width of about twelve feet on the bottom. Its width at the top was about the same with straight gunwales while the keel boats were something like five or six feet in width.

I saw boats loaded with pig iron come down the stream and dock at New River depot. The boat which I mentioned having been at Towe's Ferry came in while I was there. It was a little gasoline boat.

The witness testified as follows on Recross Examination:

I testified that I had seen boats unload pig iron at New River Depot. I had not seen the boat coming in but saw it when it was landing there, when it was being unloaded. The motorboat which I saw as high up as Towe's Ferry was the same one we took to Hinton and used to haul people and stuff back and forth to Towe's Ferry—a regular pleasure boat. I never saw it but once. It was a good-sized skiff with a motor in the rear end. There were three such skiffs in all with motors in them, on the same order as a rowboat.

I took only one trip on the McWane boat while I was at Radford. Mr. McWane asked me to go along with him to Hinton and employed me for the trip; he paid me but I don't know how much. I think this boat was built in Lynchburg and shipped up there. I won't be positive about that, though; I think so.

The coal which was hauled on the river was carried in a keel-bottomed boat and was going downstream. I don't know where the coal came from. I saw it at only one point. I saw several bateaux carrying coal, as many as ten, probably at different times.

260 The witness testified as follows upon Redirect Examination:

The boats I saw carrying pig iron came in at New River Depot and landed. I guess the "Gueeassen" type of motorboat would haul four or five people.

WALTER H. TOWE testified on Direct Examination as follows:

I live at East Radford. I am a jeweler, 49 years old. I was born at Towe's Ferry in Pulaski County about twelve miles above Radford on New River and lived at Towe's Ferry from 1887 until 1901.

I saw a motorboat at Towe's ferry which came up there in 1899 or 1900. It was driven by a gasoline engine and built on the type of a keel-bottom boat. They said it came from Radford and it made quite a few trips up there and back. Sometimes it would stay at the Ferry during the night and other times it would come

and go back the same day. This boat came up and down the river, I would say, for two years. At the time my father ran the ferry the people who brought the boat up there, I think it was Mr. McWane, would put merchandise up there for my father to sell for them and take in produce and they brought the produce away with them. They had two boats. They dismantled the first one and built another one. I would say the first boat was forty-five or fifty feet long. It had a cabin on it with windows and the men would sleep in the boat which was driven by a gasoline engine with a paddle wheel on the rear. The produce which they brought up consisted of sugar, coffee, oil, and so forth.

I saw one keel-bottom boat on the river which passed by at Towe's Ferry. On one trip it went up the river about two miles above where we lived, which, I would say, would be fourteen miles above Radford.

When they were building a bridge at the ferry in 1900 some logs were floated down the river.

The second boat which I mentioned was much like the first one but not quite as large or as long and was used for a passenger boat as the other one was. I know that on one trip they came up to the ferry with the first boat tied on behind the second, on which there was a keg of oil. Either the first or second carried passengers. They issued a schedule or bulletin for the second boat as to the certain places at which they would stop. I
261 would say that this boat ran on the river for twelve months but am not positive. My father carried horses and wagons, sheep and cattle, anything that might come along, on the ferry which he operated. He moved there in 1881 and stayed until 1901.

On Cross-Examination the witness testified as follows:

I don't know what keel boat it was that I saw pass Towe's Ferry or what year. I just remember seeing it pass. It looked to be about fifty feet long, with five or six men on board who were polling the boat going up the river. I never saw it come down the river. Mr. Robert C. McWane, who used to be connected with the Pipe Shop in Radford, was in the boat when it came up.

Mr. McWane had two boats. The first one had a superstructure and a motor in it. Later they took the superstructure off and took the motor out and put it in a new boat. Two boats came up at the same time, one towing the other. They said the one being towed or pushed was the hull of the first boat. I thought that its hull was the same size and shape as that of the original boat. Mr. McWane owned and operated the boats but did not take every trip.

The witness on Redirect Examination testified as follows:

I would say this passenger boat would haul twenty to twenty-five passengers.

The witness on Recross Examination testified as follows:

The boat would haul twenty to twenty-five passengers. On the occasion when I went up above the ferry there were not that many passengers but I think possibly there were five.

E. H. LINKOUS testified on Direct Examination as follows:

I have resided at East Radford since 1892 or 1893. I am past sixty-eight years old and have lived on New River pretty much all my life. I lived across from Pepper Tunnel and have seen boats on New River going up and down the river cross from the tunnel. They were round-bottom boats called keel bottom.

262 I would not want to say what their length or width was, or what their capacity was. I was small, not over eight or ten years old.

Q. How long did you see these boats going up and down the river, how many years?

A. I would say from the time I remember distinctly—must have been about three years or four.

Q. How old were you when you remember distinctly?

A. I could not tell you that. I was small and I didn't think anything about it, you know.

Q. Did you move away from New River?

A. Well, we moved a little distance away; yes, sir.

Q. Was it just in your boyhood you saw these boats going up and down?

A. The N. & W. built a road up there, the Pocahontas through there, and the boats stopped, you never saw any more of them.

Q. After the N. & W. built the boats stopped?

A. Yes, sir.

Q. But up to that time you saw the boats?

A. Yes, sir; I did.

Q. Do you know a place on the river called White Thorne?

A. That is where I live.

Q. Is that where you saw the boats?

A. Yes, sir.

Q. How far is that from the town of Radford?

A. I suppose about three miles across.

Q. Three miles from Radford?

A. You would have to cross about twice, it is not over three miles, I don't think.

Q. How far is it from Radford up the river?

A. It might be as much as twenty miles, it goes around what they call the "horse shoe."

I remember some of the old slave negroes who navigated these boats. They were old slave negroes, Frank Bannister, Calvin Bannister, Roland Stuart, George Brown, and a Lewis
263 negro. The boats would pick up produce as they went along up and down the river. They would blow a bugle as they passed by. I sold eggs to them. My father raised corn, wheat, and oats on his farm, some of which he hauled to New River and some of which he sold around home. He did not put it on boats at New River. He had a ferry.

Q. This produce you sold, did it go up the river or down the river?

A. Went down.

Q. Down where?

A. Said they was boating from New River to Hinton.

By Mr. ABBOTT. We object, if your Honor pleases, to what people told him.

I think the greatest number of boats I ever saw at one time was four. As they passed down by our house I would see the crews at White Thorne and afterwards would see the same boat with the same crew again several days later when the boats came up the river. I never sold them any cargo or produce or knew of them taking on any coming up the river.

The witness on Cross Examination testified as follows:

My father had a farm and raised ordinary farm products but never shipped them on the water.

Q. How often would you see these boats pass?

A. I hardly could give you an estimate of how often. Probably I would see them two or three times or three or four times during the summer.

Q. Did you ever see them in the winter or fall?

A. I don't think I ever saw them in the winter. I am sure I did not.

Q. You saw the boats pass three or four times a year?

A. Yes, sir.

Q. And I understand you are hazy about how long that time covered. You were small at the time you said, and you didn't know whether it was one, two, three, or four years. Is that right?

A. What do you mean?

Q. I will ask you this question. How many years did you see those boats pass; was it three or four times a year?

A. Yes, sir.

Q. And for how many years did you say?

A. Something like about three years I suppose. I wouldn't say exactly; I wouldn't like to say.

264 E. P. HARTSOCK testified on Direct Examination as follows:

I live at East Radford. I am thirty-five years of age and have been employed as a common laborer on the Norfolk and Western Railway since 1918. I have worked all the way from Bristol into Roanoke and into Bluefield, including the branch in the confluence of the Little and New River. This branch line runs out from the main line a little over four miles up to Little River Quarry from Radford and crosses Little River. On one side it goes up the river a piece and then across the river. The place at which I worked is a little over four miles upstream from Radford.

I was loading ties there which came from all parts of the country. Part of them came down the river by boat during all the years between 1919 and 1923. I could see the boat from the bank and around for about a mile from where I was located. I could see the Radford dam site which was, I suppose, one-half a mile upstream. The boats which came down the river passed the Radford dam and carried a load of fifty or more ties. These boats came once a day, arriving between twelve and two o'clock and carried a crew of from four to six men. They unloaded the ties on the river bank and transferred them to the loading dock of the Norfolk and Western for inspection and they were taken up by the Harrison Tie & Lumber Company. The ties were 7 x 9 x 8½ feet long, of oak, and weighed around 200 to 250 pounds a piece.

I only saw one small motorboat which I saw back of my home at East Radford. It was running up and down the river when I was just a child.

The boats coming down the river hauled around fifty or more ties on a load almost every day during the summer season for a period of four years between 1919 and 1923.

On Cross-Examination the witness testified as follows:

I was one of the right-a-way men for the Norfolk and Western. I was on the branch up to the quarry all the time from 1919 to 1923, working there practically every day. I was up at the Little River practically all the time. When I was not loading ties I did other work, leaving my home at seven o'clock in the morning and departing again at about two-thirty.
265 I never did any work lower down along the river.

I saw only one boat at a time. The same boat, I believe. I don't know whether the same people were working on it or not. The boat crew consisted of four to six men. The boat was propelled by polling by manpower.

The small motorboat which I saw from my house was just a canoe like one with a motor on it.

The ties were brought down and piled on the bank and then they would be piled on the loading dock to be put on the cars.

The boat came down between twelve and two o'clock when I was there. Except for the ties which I saw unloaded at the river bank there was no way to tell which ties came down the river and which came from Snowville and elsewhere by road. The ties which I saw on the river amounted to between fifty and sixty a day, a little over fifty. The boat would come down New River and would go up about a thousand feet on Little River which comes into New River just below the Rock Quarry.

The witness testified on Redirect Examination as follows:

I saw some rough lumber hauled down the river sometimes, down to where I was, by the same boat.

R. L. HOWARD testified on Direct Examination as follows:

I reside in East Montgomery County, just across the Roanoke line on the Lee Highway. I am 74 years of age and engaged in farming. I was born and raised 250 yards from New River, in the Southwestern part of Pulaski County, on the northern or northwestern side about a mile below Allisonia as you go up by the river. My father's farm joined the place called Clark Mines. There was an iron mine there which in later years became sort of worked out and the Bertha Mineral Company opened it as a zinc mine and operated it until the zinc ore was exhausted.

The iron ore from the Clark Mine when it was first opened was hauled directly down to the river at a kind of wharf built along the river bank and was loaded at the wharf into keel bottom boats and boated down the river to the mouth of Mack's Creek where it was loaded on wagons. It was something like six miles from where they put the ore on boats down to
266 Mack's Creek. After the ore was taken off the keel bottom boats at the mouth of Mack's Creek it was hauled about two miles up the creek to the furnace and smelted into pig iron. The smelter was known as Mack's Creek Furnace. Some called it Radford Furnace.

They had a ferry at the mouth of Mack's Creek by which the pig iron was hauled across to Dublin and there loaded on a train. I couldn't say whether or not they ever boated any of this pig iron down the river from Mack's Creek furnace.

I have seen boats going up and down the river dozens—hundreds of times. I have been thousands of times, I reckon, at Boom Furnace, where iron ore was smeltered into pig iron.

Q. And what become of that pig iron, if you know?

A. When they first opened the furnace for a first short period, it was hauled across the river and across Draper's Mountain down to what was known as Martin's Tank—Pulaski City it is now, but

it was Martin's Tank at that time. I had a verbal contract with the Superintendent of the furnace when we weren't busy with the teams on the farm that we would send them there regardless of any other talk, take a load or two and sometimes two to five, but we would stop across the mountain at Pulaski. That was right in the beginning of the opening of the Reed Island Iron Company Furnace or Boom Furnace.

Q. How long did that continue?

A. Hauling it?

Q. Yes.

A. Well, across the moutain it kind of slacked up directly because they put in boats and boated it down the river to New River Depot, but occasionally there would some man take a load across the mountain.

Q. Why didn't you continue to take it over Draper's Mountain to Pulaski?

A. Well, I did occasionally, but a great deal of it I hauled to the mouth of Reed Island and dumped it off on the river bank where the boats come up there and they would load it on and sometimes I would go to the furnace after a load of iron and bring it down there and when I would get down to the ferry the boats would be there loading the iron and I would unload it, have my helper and me unload it off of the wagon right
267 on to the boat in place of throwing it off on the ground and then picking it up again.

Q. Do you know which was the cheaper way of moving that iron—by Draper's Mountain or by the river?

A. Nothing only from observation. They paid me $3.75 a ton for hauling No. 2 and $4.00 a ton for hauling No. 4 iron from the Boom Furnace to Pulaski City. They gave me a dollar a ton if I hauled it from the furnace down to the river and throwed it off there.

Q. And what did it cost, if you know, to take it down the river?

A. Well, that would be just supposition with me. I don't know that I ever heard anyone say. It taken three men to operate one of those keel-bottom boats and about six tons was a load for it. They would take it down the river, go down in one day and ordinarily they could get back in another day, take about two days for three men to put six tons from the mouth of Reed Island on to the ground at New River Depot.

Q. State, if you know, what percentage, approximately, of the pig iron went down the river?

A. Oh, I would guess after they got the boats under way, 80 percent of it.

Q. And for how many years did that continue?

A. I just can't remember, but I would say offhand about eight years or something like that. I was familiar with all of the conditions there at the furnace, hauling iron and all like that.

I could not say how far it was to New River bridge from where the pig iron was put on the boats. It was right close to thirty miles from the Boom Furnace down to New River Depot. The furnace was not on the river. I would say it was twenty-six miles from where the iron was loaded on the boats at the river at the mouth of Reed Island.

Q. Do you know where the Appalachian Electric Power Company dam site is?

A. Yes, sir.

Q. Would those boats have to pass that dam site to get down to New River bridge?

268 A. Yes, sir.

Q. Do you know whether the company that was producing this pig iron had any boats?

A. They had four.

Q. And how frequently were they using those boats?

A. They used them regularly. It was a part of the equipment of operating the furnace like they had teams in a coaling ground, you know, and they operated them regularly. I didn't unload iron off of my wagons regularly because very frequently I would go to the furnace and get a load of iron and come back to the ferry and there would be no boat there. I would take it then and go on.

I have seen other keel boats on the river. They had no regular schedule but came at intervals from Radford. They would bring up stuff before the Boom Furnace ever was built. Between the forks of the creek there was a country store to which they would bring up goods frequently. Big Reed Island Creek and Reed Island Creek came together into New River about a half mile from the river forming a creek which flowed into the river downstream. I was born and was raised right across the river nearly opposite from where they came into the river. The boats which I spoke of were keel-bottom boats. I first saw them on the river probably when I was ten years old. That would be sixty-four years ago.

Q. How long did you continue to see the boats running on the river?

A. I expect they continued on until the Cripple Creek Railroad was built. There were three niggers operated a boat there pretty regularly and they would come up there and bring stuff and there was a large trade in what was known as white pine shingles at

that time. That was in the pine region of Carroll County and they hauled them down to this store and hauled them at accessible points along New River and there was hundreds of thousands of them boated down the river.

Groceries and salt and other stuff brought in from some wholesale point was taken up the river. The store was located between the forks of the Big and Little Reed Island Creeks and the groceries and things of that kind were brought up the river to that store. The three negroes I referred to would take the boat
269 up almost within wheelbarrow distance of the store. On the return trip they would invariably bring down more or less shingles.

A man named Charles Kirkwood, who lived near Pepper's Ferry, got me to go with him over there and he bought twenty-five thousand white-pine shingles at Camp Stevens, which was located right between the creeks at the point of the store. The shingles were loaded on a keel-bottom boat operated by three darkies. They got shingles at various times and took them to Charles Kirkwood's farm down about Pepper's Ferry, which is north of Radford and downstream from it. I would say it was thirty miles, at least, from Reed Island Creek to Pepper's Ferry by river.

A man named Bob Woolwine was superintendent of the poor for the Newbern district, located at what is known as the old Woolwine place, some fifteen or sixteen miles below where we lived on the south side of New River. At one time I know he came there and bought a lot of corn which my father shelled out and loaded on a keel-bottom boat. It was taken down for the paupers of that district.

I have no idea of the number of shingles altogether which I saw taken down the river by boat. It would take a Soloman to estimate that—hundreds of thousands of them. Generally they were taken to Radford and other points like where Mr. Kirkwood and Mr. Allen Eskridge lived on the Lee Highway above where I live. I remember once he came there and bought twenty-five thousand shingles and they were boated down to the nearest point from his house which they could not get to exactly.

I remember when the Cripple Creek branch of the Norfolk and Western Railroad was built, something like 1880. This railroad has a bridge across the river. The stone for the piers for the New River bridge was quarried on my father's farm and hauled down to the river from the quarry, about half a mile, and loaded on keel-bottom boats there and boated down to where the pier was built. This was about four miles by road but the river makes nearly a horseshoe bend about two miles below where we

lived, and I think it would be five miles down the river. The boats were keel-bottom boats. I am not clear about how much was carried at a time but I should say it was about two yards and a half or three yards of stone which weighed forty-eight hundred pounds to the yard. I think two and a half or three yards was about a boat load.

270 I never measured one of the keel-bottom boats, but I was familiar with them and would guess their length to be around seventy feet. The width varied. Some of them were eight feet from gunwale to gunwale on the top. I would guess that the depth of the boat inside was three feet or three and a half. I think these boats ordinarily carried about six and seven tons and real large ones would carry, I expect, eight in normal times. Three men operated these boats both upstream and downstream.

A ferry called Howard's Ferry belonged to my father, and I operated it time after time. We carried anything that you would get on the ferry—teams, tools, cattle, sheep—everything. The ferry was located just west of the mouth of Reed Island Creek on New River.

Q. Did you ever see any work done in the channel of the stream at any time?

A. Yes, sir.

Q. When?

A. I am not clear about that date. It was in the early eighties.

Q. Where?

A. That that I observed was between where we lived and Allisonia, in that mile stretch there.

Q. What kind of work was being done?

A. They were cleaning up the channel, blasting out ledges and moving them out, moving the rock and dirt out of the channel.

Q. You have testified that you saw boats in your early childhood. Did you see boats after the channel was cleared out on the river?

A. Yes, sir.

Q. What effect, if any, did the clearing of that channel have so far as the boats were concerned?

A. I just couldn't say. I don't remember that I ever heard any one say. If a boat was loaded heavy, it helped. There was no doubt about that because it give more current.

Q. From your observation did it or did it not help?

A. I would think it helped; yes. That is my opinion of it.

271 When the river was real clear you could be on the hillsides along anywhere on either side of the river, and you could see the channel in the river plainly and tell where it was cut at.

When the blasting was done on the river Colonel Smith was in charge and Jim Weigal was the foreman. They worked for the Federal Government.

I think it was somewhere around 1886 when the first train came up on the Cripple Creek division of the Norfolk and Western.

The furnaces which were accessible right at New River were called Mack's Creek, Boom Furnace, Barren Springs, Foster Falls, and Ivanhoe. They were all right along the river and all of them were operated before 1886. Before that year there was no rail connection between these furnaces and their markets.

The witness testified on Cross Examination as follows:

I worked at sharpening steel on the Cripple Creek construction right across the river opposite where I lived the first year when they worked on the grade. I don't recall the year. They laid the track two or three years after that. Along in July, I think it was, they quit and put away their tools and came back again after a year or eighteen months and finished the grade. By the first train which was run on the Cripple Creek division in 1886, I mean the first train that was run past my place. I think it was operated lower down some time prior to that, probably a construction train or something. I think that in 1886 the railroad was completed only to Foster Falls. The Boom Furnace was built some time before that, I can't say definitely.

After the railroad began operation I think iron was hauled or boated away from Boom Furnace, either down the river or hauled across to Pulaski. I do not recall when Boom Furnace went out of blast as I had moved to where I now live. It was merged into the Virginia Iron, Coal and Coke Company which put out of blast all furnaces which they came into possession of in Southwest Virginia.

This boating of iron from Boom Furnace started later than the beginning of the first operation of the furnace, but a little bit later the Reed Island Iron Company had four keel bottom boats built by a gentleman at Radford. It might have been Mr. Hodge. I knew virtually all of the persons who boated the iron from Boom Furnace. I don't know if I remember now. One
272 of the boats had three negroes on it and two lived on my father's farm—Ed Bland and John Johnson and Ed Hall.

These three made one boat crew and Bob Whitt and two of the O'Dells and Mr. Jim Owen had charge of it. A man named Farris helped, and there were others whose names I do not recall. I seem to have a faint recollection of a Mr. John Canode having charge of the boating at one time.

My father had a standing contract with the Boom Furnace to haul pig iron by wagon to Pulaski. A man named Taylor who

lived a mile and a quarter west of us also had such a contract. Other people hauled, but whether they had any stipulation about loading I don't know. We had a contract covering any time we wanted to send a team, no matter when, to take a load to Pulaski City. That arrangement kept up until the railroad was built.

It is partially true that the hauling of iron kept up to Pulaski until the railroad was built. There was a little iron hauled across the mountain even when there was boating there. The Boom Furnace had thirty or forty head of horses and mules. I don't think these teams were utilized in hauling iron to Pulaski. I can't recall that I ever saw the company's team take a load of iron to Martin's Tank. I reckon they hauled at first, but after they started the boats the company's teams did the hauling to the river, Allisonia, and Reed Island and unloaded it there. All of the teams did that. Our contract was to unload there when there was a boat at the river, and we got one dollar a ton. All the teams engaged in hauling hauled iron to the boats that way and hauled some and crossed up at Barren Springs.

The company's teams operated a number of years on the opposite side of the New River from the furnace, and would leave the furnace, going to the coaling ground after a load of coal and put in a couple of tons of pig iron on a two-horse team and unload there and go back and get a load of coal and go back to the furnace. I don't know that the furnace put out any more iron than it did before. I think it was about a ten-ton furnace and that was about all it could put out. They had to have teams. They had to haul feed. They didn't raise any feed and had thirty head of big stock. They had to get feed all over the country wherever they could buy it and I guess it virtually taken two teams to haul feed.

Q. Have you got any basis for guessing that 80% of the iron from Boom Furnace went down the river; you said you
273 would guess 80%; that is just a guess?

A. Sure. I didn't weight it or take any tally or keep a tab of it, but I know in a general way there was time after time hauled there and boated from the mouth of Reed Island and Allisonia both, and I would guess from the amount of teams that ran there was at least 80% of the iron from Boom Furnace taken down the River. I think that would be the assumption of any man familiar with the conditions around the furnace.

Of the people who operated the boat which I saw when I was a boy a negro named Ed Armstrong, Ed Floyd and Whit Tate operated a boat pretty frequently from Radford up there, I should say once a week at least, probably not quite so often, but they made regular trips.

Q. Wouldn't it be about twice a month and then it would be three months before it would come again?

A. I don't think it was over a period of three months. I know this negro Armstrong had an old fashioned tin bugle and he would always blow when he got up to the mouth of the creek and we noticed that. We had a hundred acres of New River bottom land and farmed it continuously and we would see them come and go. I didn't try to keep no tab on it, because I had no reason to do so, and they made frequent trips up there, as other citizens of my age would tell you. There was hundreds of thousands of white pine shingles taken down the river.

Q. How much corn did your father send down to Mr. Woolwine's on the boat?

A. Fifty bushel at that time.

I have probably ridden on a keel bottom boat on the river for short distances. I never did go down on a boat from Clark's ore bank to the mouth of Mack's Creek or down the river on a boat from the mouth of Big Reed Island to Radford. I can't recall in what year ore was hauled from Clark's ore bank by boat to the mouth of Mack's Creek. It was right after the furnace was built and opened up. They would haul ore down from the ore bank to the river and shove it off the wharf there and take it down to Mack's Creek. I never took that trip on a boat.

274 I do not recall in what year Mack's Creek furnace was built. This hauling of ore from Clark's ore bank to the mouth of Mack's Creek was not long after the furnace was built. It was before the Government improved the channel in the river.

At one time ore was boated from Clark's ore bank down two miles to Breeden's Hollow and hauled over the mountain by wagon to Mack's Creek and then it was boated lower than that by the company at Mack's Creek. I don't recall who the boatmen were. I was never at Mack's Creek when the boats were there but I saw them load on the wharf a little over a mile below where I lived time after time. Some of it may have been hauled down to the foot of Breeden's Hollow which was known locally as Spencer's Hollow but some went down to the mouth of Mack's Creek. I never was there when they took the ore there but I saw a man who did see it taken there.

Q. You said that this hauling of iron from the Boom Furnace kept up for eight years?

A. I would guess that is right, I kept no tab on it.

Q. If the Boom Furnace was constructed in 1881 and the railroad got up there in 1886, would that change your ideas about the period of time the iron was boated down the river?

A. I don't know when the furnace was erected and put into blast. I know when it was done but I don't know what year.

Q. I said if it were 1881 that the furnace was constructed then it wouldn't have been but for five years the iron was hauled down the river on boats?

A. I would have to be convinced it was 1881, when it was built. Eighty percent of the iron was hauled down the river by boats from the time they began to boat until the Cripple Creek road was built. It might have been seventy-five percent or eighty-five percent. That was just an estimate.

I could not fix the time exactly how long after the furnace was constructed before they began hauling the iron by boats down the river. It wasn't a great while. It might have been six months or a year. I commenced hauling iron away from there right after they started making iron and I kept it up until they built the Cripple Creek Railroad. Some years later they built the Betty Baker branch right at Reed Junction
275 and there was no hauling done anywhere. They loaded the iron right onto the train. There is a ford in New River about a mile below Howard's Ferry, where I used to live, that is, right where Allisonia is now. I do not know that they ever hauled iron across that ford which was a fairly good one. Where they cleaned out the channel people claimed the ford got mighty deep and I experienced that myself. The cleaning out of the channel didn't ruin the ford but it added something to the depth near the middle of the river. The ford is there yet. About the only observation you could make was that the water would come up further on your wagon or horses. There was no sudden drop off.

Q. I believe you testified these keel-bottom boats had a draft of three and a half feet, a depth or three and a half feet?

A. Three or three and a half. I never had any occasion to pay any particular attention, but I would guess three or three and a half feet.

Q. Would that be the distance below the surface of the boat when moving on the river?

A. No, no; they was loaded down, six or seven ton would put them down that far [indicating with hand].

Q. That far is how many inches?

A. Well, my acquaintance with them would be, it wouldn't be safe to load a keel-bottom boat, or it wouldn't make a shoal more than two or two and a half feet under the water, the draft.

Q. But you indicated now much of the boat would be out of the water on your arm, what in inches was that distance?

A. I would say twelve inches anyway, you strike places in New River, if you never was on a boat going up there, that the waves would run over the "gunnels" from the sides, if you got over that,

twelve or fifteen inches would have to be above the surface of the water.

I hauled some stone from the quarry to the ferry and put it on boats and my impression is that about two and a half or not over three yards of stone was loaded on the boat. Pure limestone weighs 4,800 pounds to the cubic yard.

By the COURT:

Q. You spoke about these boats that brought the shingles down the river and came back loaded with supplies from that store?

276 A. Uh huh.

Q. That store, as I understand, is up at the junction of Big Reed Island Creek and Little Reed Island Creek?

A. Yes, sir.

Q. Did this boat come on up Reed Island Creek to the store?

A. Sometimes under normal conditions it could go up the two creeks to the fork and turn to the left and go up Big Island Creek within 300 yards of the store.

Q. That was several miles from the river, wasn't it?

A. No; the two creeks, the junction of the two creeks, I would guess is a half mile.

Q. But this boat would come up the river and go up Big Island Creek within a few hundreds yards of the store; is that right?

A. Yes, sir; normally. Now in hot August and September and along, the creeks would get very low and they could not get up there, but they would come up to the mouth there to the ferry. I remember one occasion they come up after shingles when Cafee and Stephens operated the store and had to haul the shingles by wagons and load them on the boat.

The witness testified on Redirect Examination as follows:

Mack's Creek enters the river five or six miles farther downstream than Big Reed Island Creek.

The Boom Furnace had one of the finest mines in Southwest Virginia, dumped it right over the cliff. You could throw a rock from there into the furnace.

The ore from the Clark mine was operated and the Mack's Creek Furnace Company opened and developed the mine and used the ore exclusively for Mack's Creek.

The pig iron made at Boom Furnace is the iron we have been talking about which went down on boats all the time to New River Depot. I never saw boats coming into New River Depot but saw them unloading pig iron which came from some furnace. The two negroes on the boat which was unloading it lived on my father's place and worked for him when they wasn't at something else. They lived on his farm at New River Depot. They

worked on boats which came from Boom Furnace and brought pig iron from the Boom Furnace.

If you wanted to cross the ford above my father's place from the north side to the south you would get on a horse
277 and ride across the river. You could ford at this point with about a twelve-inch tide in normal times. The water came up on his side if there was any tide much.

WILLIAM COLLINS testified upon Direct Examination as follows:

I live at Salem, Virginia. I will be sixty-four years old in September. I was born in Pulaski County on New River about four miles above Towe's Ferry and something like twenty miles above Radford. I lived there above Towe's Ferry until I was at least twenty years old. Then we came down to Howe's Farm which is just above Little River on Dunkert's Bottom. I lived about four miles above where the Appalachian Electric Power Company's dam site is.

I have seen boats on New River from Mack's Creek plumb through all the way to Hinton. Hinton is on New River on the C. & O., in Summers County, West Virginia. I have seen keel-bottom boats on New River from sixty to sixty-five feet in length and about eight feet wide. They used to run from eight to ten of these boats from Mack's Creek on New River down to New River and from New River to Hinton.

I have made the trip from our place down to Hinton by boat with my father when I was quite small. These boats hauled wheat and corn and goods, that is merchandise, up and down the river. My father ran one boat of which he was the manager and I have taken the trip back up the river in the boat.

I have seen logs and rafts on New River. I have helped my father raft logs from up at Dunkert's Bottom, along above Towe's Ferry, to New River bridge and to Hodge's saw mill.

The boat called the Hodge boat was about seventy-five feet long and used for a steamboat to ride up and down the river. It went up above Radford to Howe's. Howe's farm, I believe, is about seven miles above Radford and above Dunkert's Bottom on the right side of the river going upstream.

I have seen log rafts coming down the river and have gone up the river for the rafts above Towe's Ferry which is something like twenty miles above Radford.

The keel-bottom boats which I have mentioned hauled pig iron from Mack's Creek to New River Bridge Depot. I have been on these boats on a few trips with my father who ran one of them. We started from Towe's and went to Mack's Creek Furnace. On return my father would come to New River and then

have trips on through to Hinton. These boats would unload the pig iron at New River Depot. We unloaded it on the wagons and then put it on the train. I have seen grain carried on these boats from different farms up the river and hauled
278 down the river, unloaded, and then hauled to Grayson's Mill on wagons.

Q. How many trips did you make to Hinton?

A. I just cannot recall. I never did make but very few. I was small at that time, and I just can remember good.

Q. On your way down to Hinton were there any stops made?

A. According to what they were loaded with.

Q. When you were along, where did they stop?

A. They would stop down at the Narrows and Crump's Bottom and different places.

Q. Where is Crump's Bottom?

A. That is down below East River.

Q. In what State is it?

A. That is in West Virginia.

Q. And where is Narrows?

A. I reckon that is in Virginia.

Q. How many men ran these boats, if you remember?

A. Four.

Q. Have you ever seen any cross ties brought down the river in boats?

A. Yes, sir.

Q. Have you ever seen any floated down the river?

A. I have seen them rafted.

Q. And how far up the river did you go for the cross ties?

A. Something like 20 miles, I expect.

Q. Did you ever see any staves brought down the river?

A. Not from up in that country, but I have seen them down below Narrows, and seen them taken from there to Hinton.

Q. Many of them?

A. Lots of them.

Q. Can you give the names of some of the men that ran on these boats?

A. Yes, sir.

Q. Please give them.

A. My father, Floyd Collins, Whit Tate, Ed Floyd, and a man by the name of Dotson.

279 Q. Do you remember a man by the name of Graham?

A. Yes, sir.

Q. And Harv Gunn?

A. Yes, sir; and Steve Thornton.

The witness testified on Cross-Examination as follows:

I was born in 1873 four miles above Towe's Ferry and lived there until I was twenty years old. Then we moved to Howe's Farm and I lived there until I was thirty years old. At that time we came to Radford where I lived until I moved to Salem ten years ago. I work as a night watchman at the Salem Tannery now.

Q. When was it, Mr. Collins, that you went down to Hinton on the boat with your father?

A. I was about eight or ten years old, small.

Q. What were you doing on the boat?

A. Just riding with my father.

Q. And you were eight or ten years old at that time?

A. Yes, sir; something like that; I just can remember it.

Q. Have you been to Hinton since that time?

A. No; I have not; not since I was a boy or a young fellow.

Q. How many times did you go down there?

A. I just couldn't recall—not very many times.

Q. As many as two times?

A. I reckon I know of that much.

Q. Then as near as you can remember, you went down there twice?

A. Yes, sir.

Q. Do you remember the difficulties your father had in getting over the falls between Radford and Hinton?

A. How is that?

Q. Do you recall the difficulties your father had in getting over the falls?

A. No; but he had very little, I reckon.

Q. How much tide was there in the river?

280 A. They went all the time, that is, unless the river was up too much, they ran those boats. There was a sluice through there, and they ran them all the time.

Q. You say there was a sluice through the falls, between Radford and Hinton?

A. Yes, sir.

Q. Where is the sluice in the falls at the Narrows?

A. I think it is near the middle of the river, the best I can remember.

Q. Do you remember the falls of the Narrows?

A. Yes, sir.

Q. How high are those falls?

A. It is not a very high falls.

Q. What do you mean by "not very high"? Give us an estimate in feet.

A. Just ledges.

Q. But what is the difference in the level of the river after you get over the falls and up at the falls, below and above the falls?

A. I cannot say just what it is.

Q. Is it as much as a foot?

A. Yes, sir; I imagine it is more than that.

Q. What would you imagine it is?

A. I imagine it is probably two or three feet; I couldn't say exactly.

Q. You say this sluice is in the middle of that falls?

A. I think so.

Q. Is it pretty well marked?

A. It is supposed to be, there is wing dams on each side of the sluices.

Q. Do you recall Shumate Falls?

A. I cannot remember that.

Q. Do you recall Wiley's Falls?

A. No, sir.

281 Q. Do you recall Bull Falls?

A. No, sir.

Q. Do you recall the Big Falls?

A. No, sir.

Q. All of those falls, as I understand it, had wing walls, channels, and sluices through them?

A. Yes, sir.

Q. And you went on through like that?

A. Yes, sir.

Q. Did I understand you to say that you boated some staves, or your father boated some staves from Narrows to Hinton?

A. They boated the staves to the Narrows and from there to Hinton, from different places, from some sawmills and stave mills.

Q. You say "they." Who do you mean by "they"?

A. My father, Thornton, Whit Tate, and Dotson.

Q. Did they boat them when you were down there on that trip?

A. Yes, sir.

Q. Were you going down to West Virginia to spend the summer boating?

A. No, sir; but they would take a load of stuff to different places, and if they had stuff they would pick it up and take it to Hinton.

Q. What would be the purpose of boating staves from Narrows to Hinton after the railroad was there?

A. I don't know that they boated any after the railroad was through there.

Q. You say you were ten years old at the time you went down there?

A. Yes, sir.

Q. And that is when the staves were boated from Narrows to Hinton?

A. I don't remember about just at the Narrows, whether they were loaded or not, it was along down the river, it might have been below there.

Q. Do you remember a place called Sulphur Spring Branch?

A. No; I don't believe I do.

Q. You don't undertake to tell the Court where those
282 staves were shipped from down the river, or whether it was just down near Hinton that they were shipped on the river?

A. I couldn't recall just where they were picked up.

Q. I meant to ask you where they were loaded, and you said you were not sure, but it was down the river near Hinton that they were loaded?

A. Somewhere in that country, I just cannot recall where it was.

Q. How old were you when this pig iron was being boated down the river?

A. I was very small.

Q. Were you smaller than you were when you took this trip to Hinton?

A. I just can remember that my father hauled pig iron down the river.

Q. Were you smaller then than when you went to Hinton?

A. About the same. It has been so long, I cannot remember back so as to exactly tell you about it.

Q. Where did you father run the boat from?

A. They kept a couple or three boats about Howe's farm and when there was hauling to do they would haul pig iron, corn, and wheat.

Q. Was he regularly engaged in boating pig iron from Mack's Creek?

A. Yes, sir; and all kinds of stuff.

Q. Did I understand you to say that boats would come down and stop at your father's place?

A. A heap of times they would.

Q. The boats would tie up there for the night?

A. Sometimes they would if they were late.

Q. And then ship a new crew and go on down the river?

A. The same crew.

Q. Did you ever come down the river with any of that pig iron from Mack's Creek?

A. Yes, sir.

Q. How was that pig iron taken to the river?

A. By wagons.

283 Q. From the furnace?

A. Yes, sir.

Q. Not by tram road?

A. No, sir; by wagons, the best I can remember.

Q. Do you recall a tram road that went down to the river from the Radford Furnace, down Mack's Creek?

A. No, sir.

Q. Do you recall a ferry which had rails on it; and tram cars would be run on to the ferry and taken across the river?

A. No, sir; I cannot remember that.

Q. Did you see a ferry there?

A. I don't remember the ferry.

Q. What was hauled on the boat that you went down to Hinton on?

A. They hauled goods, produce, or anything fo people all along the river.

Q. I mean what did you see hauled?

A. I just cannot recall what they hauled, but they hauled produce and corn.

Q. From what points?

A. From different places on the river.

Q. What do you mean by different places on the river; was anything loaded at Radford?

A. I don't think there was anything loaded at Radford, but sometimes they would load things and take them down the river and unload them at the merchant's stores and places.

Q. Your father would start out from Mack's Creek with a load of pig iron and bring that to Radford and unload it?

A. Yes, sir.

Q. Then he would take the boat and go on down the river, trading as he went?

A. He would haul up and down the river.

Q. How long would it be before he came back and got another load of pig iron?

A. I just cannot recall.

284 Q. Was it a month?

A. It wouldn't take that long for them to make the trip through.

Q. How long would it take to make that trip from Radford to Hinton and back?

A. I expect it would be a week.

Q. How much of a tide did you have to have in the river to get a raft of logs over Ingle's Falls?

A. Not so much.

Q. Four feet?

A. No; you wouldn't have to have that much. I helped to raft timber through there myself.

Q. But how much would be necessary?

A. We never did pay much attention to the tides.

Q. Did you ever have a raft to break up with you?

A. Yes, sir.

Q. Did that happen often?

A. Not so often—sometimes they would "bust."

Q. Whereabouts would they bust most frequently?

A. There was an abutment just at the ferry where the old bridge used to go across, and this sluice run right down the side of that abutment, and the water kind of drawed to the other side, and if you didn't watch out it would draw you against that abutment with the raft of timber and a heap of times the pole would break and you would go into that abutment and bust up the raft.

GEORGE M. WEBB testified upon Direct Examination as follows:

I live in the horseshoe five miles below Radford, at a point which is said to be six miles from the station at East Radford—six miles by public road. From the station at East Radford the distance is much longer by the river. I was born December 24, 1855, north of Pulaski on what they call the Bentley Farm. I am going on eighty-one years old. I was only twelve years old when I came to this farm on which I live above the Horse Shoe on New River and have been there ever since.—Our
285 post office is at Belspring, about a mile or two from where we live.

Q. Have you ever seen any boats on New River?

A. These here keel-bottom boats, you mean?

Q. Yes, sir.

A. Yes, sir.

Q. When did you see those boats?

A. I never seen them until I came to the river. I don't know exactly, but it was after the Old War, I came there right after the War, and they used them boats during the War though, but I didn't see them then, they said that is what they brought them there for, and two or three years afte that my father lived up in the Horse Shoe and them boats constantly went up and down the river.

Q. Were you in the War?

A. No, sir; I was born in '55 and the War commenced in '61, and I was about six years old when the War broke out.

Q. Where did you see these boats on the river?

A. Floating up and down the river by the Horse Shoe, right around the Horse Shoe, in fact.

Q. How far up the river did you ever see them go?

A. I have seen them up at the New River Bridge several times.

Q. Did they pass your place going up the river?

A. Yes, sir; going up and down.

Q. And how far down the river did they go?

A. They went to different places. They would go to Eggleston sometimes, and sometimes down to the Narrows, and I have heard them say they went to Hinton.

By Mr. ABBOT. If Your Honor please, we object to the last statement.

Q. Whom did you hear say they went to Hinton?

A. Some of the hands on the boat, I don't remember who it was. In those days colored people generally or pretty much all colored people run the boats.

I didn't have any farm then. My father lived on Mr. Kent's part of the Horse Shoe and it ran to the bank of the river. He lived not more than a hundred yards from the river—just
286 about that. From our house I could see these boats go back and forth.

I worked on these boats long enough to haul five hundred bushels of wheat from the Horse Shoe to New River Bridge. We would carry one hundred bushels in a load and I made five trips. I have also seen lumber and passengers on these boats. They fixed up one boat to carry passengers back and forth between Radford and Eggleston Springs. There was a resort there run by Captain Eggleston who carried passengers back and forth from his place to Radford.

I don't know that I ever saw any pig iron on the shore at Radford but I used to see it piled up at New River Bridge right across from the old furnace at Radford. I think they said that a good deal of that iron was shipped down the river from Graham's Furnace or somewhere up there and was unloaded there.

When the wheat was taken by boat to New River Bridge the boat was loaded with plaster for Major Cloyd and brought back to the Horse Shoe.

I remember hearing about work being done on the channel in New River. I know this went on for several years and then in the high water of 1878 was all washed away and they never did go to work there any more.

Q. How would you know when these boats were going up and down the river?

A. I would see them; and there was an old fellow generally with them boats coming down the river on the upper side of the Horse Shoe, it made a circle where we live, and one of these boatmen had a tin horn—a bugle horn—and I would hear him blow it when he came, he would blow his bugle horn; that was Frank Bannister, one of the old steersmen they brought from James River during the war.

Q. Do you know of any other men who ran those boats?

A. That they brought from down there?

Q. No; any of the men on the boat?

A. Yes; I knew some of them. They were hands that were just hired in the country, these colored people, to manage those boats mostly, and they were just hauling stuff on them boats, and that is what they were using them for.

In my judgment the boats were at least sixty or seventy feet long.

I have seen rafting of logs on the river tried a time or
287 two and tried it once myself. I saw some logs floating down the river when the river was up—trees and logs and everything, including driftwood, but no cut logs. I saw them try to raft cut logs once or twice and they failed, there was no success to it. The plaster which was carried on the boats was used to spread over the meadows and pasture land, I believe, as a fertilizer.

Upon Cross Examination the witness testified as follows:

I live at Cowan's Siding at the west side of the tunnel and have been there fifty years. That is on the lower Horse Shoe. That belonged to Mrs. Kent. The upper part there was Major Cloyd's.

Q. I understood you to say that for two or three years after the Civil War, you occasionally saw a keel-bottom boat on the river?

A. That was about the first I ever saw. They commenced running and these barges hired hands and would haul wheat and lumber.

Q. And that went on for how long—two or three years?

A. That went on for 8 or 10 years.

Q. I thought you said on your direct examination it was for 2 or 3 years?

A. I think it was about that, from the time they commenced.

Q. Do you remember when Captain Eggleston started his operations of hauling guests to his springs from Radford on the boat?

A. I remember him, but I don't remember what year it was.

Q. Don't you recall that the bateaux had been laid up on New River—drawn out of the water—and he got one and put it in condition to haul people to his springs.

A. You say that I said that?

Q. No, sir. Don't you recall that fact?

A. I don't know. I know that they was said to be the same boats they had used back and forth.

Q. They had been used for some time before that, hadn't they?

A. Yes, sir.

Q. And not at the time he started his boats?

A. He just fixed up one; I think there was three of them
288 and he fixed up one with a cab on it for passengers, and the other two was for hauling freight back and forth.

Q. At that time?

A. Yes, sir.

Q. I understood that they had been hauled out of the river and that he got one and reconditioned it for that work. Who was it that used to blow the bugle horn?

A. A colored man by the name of Frank Bannister.

Q. You could hear him coming, could you?

A. We heard him up at Barnett's Falls, and that was about 4 miles before he got to our house, but he generally blew it at our house, too.

Q. How did they get the boat through Barnett's Falls?

A. They shoved it through there.

Q. Do you recall the original wing walls there?

A. I didn't see any wing walls, but there were some rocks there.

Q. Wasn't there some logs attached to the rocks there?

A. To draw the water when we went through there; yes, sir.

Q. It was something that somebody built there, wasn't it?

A. I reckon they did.

Q. I mean it was not a natural construction there, but something that was built?

A. It was a kind of a log line sort of out there to draw the water into the sluices. Whether or not it lodged there or somebody put it there, I don't know.

Q. It looked like it was actually set there in a natural position?

A. It looked like it; it was awful swift water there.

Q. You said that Captain Eggleston took passengers back and forth. Did he haul passengers up the river on the boat?

A. There was passengers taken down there and back—carried back and forth. I don't know who did it.

Q. They were people going to the Eggleston White Sulphur Springs?

A. Yes, sir.

289 Q. Let me get this straight: Just where on the river have you seen these boats?

A. Right around the horseshoe where we lived. I have saw them up New River when I would go over there. We generally went to New River to do our trading. Mr. Chumbley had a store there and General Wharton.

Q. Do you mean New River Depot?

A. Yes, sir—New River Bridge there.

Q. You saw boats there and down around the other horseshoe?

A. Yes, sir.

Q. And you rode on one boat that carried 500 bushels of wheat to Radford in five trips?

A. Yes, sir; I worked on that trip and helped to shove it.

Q. How many people were on the boat?

A. Only two on each side and one to steer it—there were five.

Q. How much does a bushel of wheat weigh?

A. 60 pounds, if it is good wheat.

CHARLES E. WEISS testified upon Direct Examination as follows:

I was born in West Virginia at Rock Camp in 1871. I have been sixty-five since December 20th. I don't know definitely how far from New River the place was on which I was born—possibly twenty miles. Later on I moved to what is known as Goodin's Ferry in Giles County, near Eggleston Springs. I moved to Radford in the Spring of 1887. I don't know the year definitely. You can jump back there and get it better than I can. I live on New River now. In my boyhood I lived with my father at Radford which was then called Central Depot and have lived there ever since. I am a brakeman on the Norfolk and Western Railroad at East Radford.

Q. State whether or not you and your father and brother ever operated a keel-bottom boat on the river.

A. My father told me about operating from Eggleston Springs to what was known as Central Depot. That was before my time.

(Defendant objected to this statement as being hearsay evidence and moved to strike it from the record.)

290 Q. You did not operate them yourself?

A. No, sir.

By Mr. ABBOT. We object to what his father did and move to strike it from the record.

By the COURT. You must state what you know (addressing the witness).

Q. Have you seen boats on the river?

A. Yes, sir.

Q. During what year or period of time have you seen boat on New River?

A. To tell you the truth, I didn't pay no mind to the year I seen them, but it is since I was railroading.

Q. How old were you when you first saw boats on New River?

A. Well, I haven't kept no true record of that to tell you, but it has been about 25 years ago—about 30 or 35 years ago.

Q. What kind of boats were they?

A. They was known as—somebody built them keel bottom, but some called them a bateau.

Q. Were the keel-bottom boats any different from the bateaux?

A. No, sir.

Q. Did you ever see more than one of these on the river?

A. Yes, sir; they used to run them. My brother operated one. I have been up the river in it.

Q. Where to and from what place?

A. He hauled staves and other things from Glen Lyn to Hinton.

Q. And you rode from Glen Lyn to Hinton, did you?

A. I rode from Hinton to Glen Lyn.

Q. Where would the boats deliver the staves?

A. At Hinton.

Q. What would you carry upstream?

A. He carried anything anybody wanted to send to that point.

Q. What would that be?

A. I don't know that I could tell you what it was altogether.

Q. He would carry produce, would he?

A. He would carry anything that anybody wanted to send up there—butter, eggs, potatoes, or anything that anybody wanted to send up and down the river during the time he operated
291 his boat, hauling staves and sand. He did not haul sand from that particular point.

Q. Where did he haul the sand from?

A. From different points along the river.

Q. From different points along the river between Hinton and Glen Lyn?

A. Yes, sir.

Q. Where would he get the staves?

A. He got the staves at Glen Lyn to haul, at the station there.

Q. Were they prepared there from lumber?

A. Yes, sir; they made them there.

Q. Was there a sawmill there?

A. Well, there was one not right at Glen Lyn, but there was one there that they used.

Q. How many staves did they carry on one boat-load?

A. I could not tell you how many; I could not tell you how many hundreds they carried.

Q. Can you make an estimate for us?

A. I don't know whether I could make a real true estimate. You gentleman could make it better than I can. I am not qualified to make it.

Q. You saw the boat there. Was it full of staves?

A. The boat ran about 50 or 60 feet or more long, and they loaded it down with staves and my brother said that they would put the staves on the edge—on edge to keep the water from getting in the boat, and that it was 4 inches above the top.

(Defendant objected to what the witness' brother told him and moved to strike it from the record.)

Q. You saw the staves in the boat, did you?

A. Yes, sir.

(Defendant objected to the question as leading and moved to strike it and the answer from the record.)

Q. Have you seen staves in the boat?

A. I never saw him load it, but I know he hauled them.

Q. Did you see them hauled in the boat?

A. I could not say I saw him load them.

Q. Have you seen the staves in the boats on the river?

A. No, sir.

Q. How do you know that they were hauled to Hinton?

292 A. I got his word for it. He did it as a business for two or three years or more. He worked at it as a business and he owned the boat—he built the boat; he built a new one or two.

Q. At the time you went from Glen Lyn to Hinton, what did the boat carry?

A. You mean from Hinton up there?

Q. Yes; from Hinton to Glen Lyn, what did the boat carry?

A. I had my family with me. He didn't have anything particular on the boat but him and my family and the workmen. They were coming for a load then.

Q. At the time you came from Hinton to Glen Lyn, you carried your family and you and the crew?

A. Yes, sir.

Q. How many did that comprise?

A. At that time it was my wife and two children—there were four of us.

Q. How long did it take to make the trip?

A. I disremember definitely, but something like 4 or 5 hours, maybe more or less; I don't know definitely; I don't remember definitely.

Q. How many men operated the boat?

A. Anywhere from 4 to 5.

Q. How did they propel the boat up the river?

A. They poled the boat. One man steered it and another man shoved it up the river with a pole.

Q. Going back to the sand that he hauled, where was the sand procured? Where did they get the sand?

(Defendant objected to this, unless he called for what the witness himself saw and knew.)

Q. Do you know?

A. Along at different points along the river. It was not as far as Glen Lyn. He hauled where it washed out, and it was used for concrete. They had to have clean sand for concrete.

I have seen a motor boat on New River belonging to a Mr. Hodge which he used to haul ties down the river. I saw the ties unloaded. They unloaded them where the railroad bridge goes across the New River at the mouth of Little River. There
293 was a road running up to the mines across the river which goes to the Appalachian Electric Company's quarry. We haul stone from there now. He hauled stuff down to New River. Mr. Hodge's boat unloaded ties at the mouth of Little River. I don't know where he got them. I have no idea; it was a long distance. It was some place up the river. The boat came from above the Appalachian Electric Power Company's dam site above Radford and passed that point coming to Little River. I saw the boat hauling ties more than once. It might have been for a year or so that they hauled for different times down there.

My brother operated the boat from Glen Lyn to Hinton for two or three or four more years. I don't know definitely.

Upon Cross Examination the witness testified as follows:

I don't remember definitely the year in which I took the trip from Hinton to Glen Lyn on the bateau. It was between thirty-five and forty years ago. That one trip was all I took on the boat up as far as Glen Lyn. I had been down there to visit my brother and was coming back home. My brother is living. He was in Hinton the last account I had of him. At the time, as well as I can remember, I was working on a dining car for the the Norfolk and Western. I commenced working for them in 1899.

Q. Where did you get off the boat at Glen Lyn?

A. It was not right at the Glen Lyn Station, but some distance below there.

Q. Was it below Shumate's Fall?

A. As well as I remember, it was above Shumate's Falls.

Q. How did you get over Shumate's Falls?

A. As well as I remember—I don't know definitely, but it seemed like they had a channel that they ran in.

Q. And they came through Shumate's Falls in a prepared channel, did they?

A. Well, I don't know definitely whether it was prepared or not. All I can give you is what I heard my father say—was that they shot out the channel and I have no right to doubt it; that they shot out the channels for the boats to run in;
294 and a man had to know how to run in the channels; if he didn't, he would break them up.

Q. The channels were pretty well defined—or the channel was, through the Falls?

A. How is that?

Q. I say that the channel can be seen. You can tell where it is?

A. Yes, sir; you can pretty well tell, or you could not run in it.

Q. What I am getting at: Is there a channel through Shumate's Falls?

A. I think so; but Shumate's Falls—when the river is low there would be somewhat trouble to get through there.

Q. How high was the river when you came through?

A. The river had much more water in it than it has today.

Q. Did it have four or five feet more?

A. I expect so, and maybe more. The drought has dried up the springs and the streams.

Q. I believe you said that the river was 4 or 5 feet above what it is today?

A. I would not like to say what it was, but there was more water in it than it is today.

Q. Now, the water coming over Shumate's Falls——

A. (Interrupting.) I don't remember definitely whether or not the place they ran in for the staves was above the Falls, but I know where the Falls is, and you cannot run over it with a canoe now.

Q. Do you know Wiley's Falls?

A. Yes, sir.

Q. Did you come through that on that trip?

A. We ran through these Falls to Wiley's and down in there.

Q. This was the only trip you made on that boat, was it?

A. Yes, sir.

Q. Did you come through Wiley's Falls on that trip?

A. We came up to Glen Lyn.

Q. Do you recall Wiley's Falls?

A. Yes, sir; there was a falls there, as well as I remember, named Wiley's Falls. I will not state definitely about that. I said so far as I know.

295 Q. Did you come into the channel of Wiley's Falls and go through there on the water?

A. There is no other way to go through them without coming through a channel. You had to have a channel to get through.

Q. You had to have a channel to get the boats through?

A. Yes, sir; in other words, without the water was high enough to take you without it.

Q. Where did you see your brother load the staves on this boat?

A. I never said I saw him load them.

Q. You never saw the staves loaded on it?

A. No, sir; but the staves was there on the bank, to load.

Q. Where?

A. On the bank where they run the boat in. They had a place to load them below Glen Lyn. I don't know where the place is definitely, but he hauled them.

Q. Do you remember a place where there was a station yard called the Sulphur Springs Branch—do you know Esther French?

A. No, sir.

Q. Do you know where Polly Walker's place is?

A. No, sir.

Q. Wasn't the stave place or factory in West Virginia?

A. I don't know; it was not far from Glen Lyn; you called yourself going to Glen Lyn. I don't remember how far it was. However, we came up on the boat and then we went across to the station to come home.

Q. There was a railroad to Glen Lyn at that time, was there?

A. The Norfolk and Western Railroad; yes, sir.

Q. At the time you say when your brother was doing this boating?

A. Yes, sir; that railroad has been through there for 50 years or more. It was there for a number of years before I went to railroading, and I have been railroading for 38 years.

Q. Where do you work on the railroad?

A In the East Radford Yards.

Q. All of your testimony about the boat going to Glen
296 Lyn, from Glen Lyn to Hinton, prior or aside from the time that you went there to Glen Lyn, is based on what your brother and other people told you, isn't it?

A. Well, certainly. I was not operating the boat. My brother was. I had no right to doubt it. There is no doubt in my mind about it, and I could not positively say I seen him load the staves

and operate the boat with the staves loaded, but the only way I have to tell you was to state what he told me, and then I came in the boat with him.

Q. And you——

A. (Interrupting and continuing.) It is very clear that he did it. He could tell you all about it, if you saw him, but I am telling you the facts what I know. I could not tell you I hauled it when I did not.

Q. Yes, sir; but facts are proved by people that know them and not by those who have just heard about them.

A. I understand that, too; yes, sir.

Q. And you say it took 4 or 5 hours to come from Hinton to Glen Lyn?

A. As well as I remember, that was about the time. They didn't travel very swiftly up the river. There was right much falls and swift water, with the exception that he told me when he could get a canvas up in the front, it would help him up the river quicker.

(Defendant moved to strike this answer as being hearsay, so far as it related to what the witness was told by someone else.)

I do not remember definitely what time the train left Glen Lyn which we got on after I took this trip. We did not go to Glen Lyn the day we came on the boat but went over the next day. We stayed that night in a tent on the river. We got some fellow to haul us over to Glen Lyn with a one-horse wagon. There were rough roads filled with rocks and we could hardly stay in the wagon. That is the reason they used the boats for hauling. I don't remember crossing a big mountain to come to Glen Lyn. I don't remember crossing any hill worth while. I was told the staves were used in Hinton. I suppose they used them for barrel staves. I don't know whether there was a barrel factory in Hinton.

The witness testified upon Redirect Examination as follows:

Q. There is just one question: This point where your brother loaded the staves on near Glen Lyn, how close was that to Glen Lyn?

(Defendant objected to the question, because the witness did not say that his brother loaded them. He said he never saw that. He simply heard that.)

By Mr. WILLIAMS. He said the staves were on the river bank. I just want to locate the spot.

I saw the staves on the river bank. I don't remember how close
297 that was to Glen Lyn. I suppose it must have been three or four or five miles to Glen Lyn across where they were with the wagons. I saw my brother's boat and I have been in it. I have seen it since then. I did not see the boat before I was in it. I had been visiting my brother and came back this

trip on the boat. My family stayed that night and the next day we came to Glen Lyn. My children were three or four years old when I brought them on the boat.

J. G. GRAHAM testified upon Direct Examination as follows:

I live close to New River at Mack's Creek, close to the old Radford furnace. I was born in 1866 in Floyd County, Virginia, which is not on New River. We came over to Pulaski and then I lived on or near New River since I was twelve or fourteen years old, from some time in the early seventies. I remember when they shot out the channel, when the Government improved the channel in New River.

The Allen brothers, Jim and Al, cut a boundary of timber close to where I lived, put it on the river and boated it down to Radford, they said. I expect there were one hundred thousand feet, or something like that, in the tract of timber which they cut. They got the timber from Mr. Henry Wilson. I couldn't tell you the date, but I was somewhere about twenty years old. It was as near as I can fix it along in 1886 or perhaps 1890. This timber was sawed along the foot of the mountain in the boundary of the timber. They logged it and sawed it there and then hauled it by wagon down the river something like three-quarters of a mile or half a mile or something. I saw them loaded there on boats. I don't know that I ever saw the boats start with the lumber on them. The boat was something on the order of a flat keel bottom, not like some of the other keel bottoms. It was sort of a short boat. I suppose it was Mr. Allen's, but I don't know. I can't say for how long a period the boat carried timber for the Allen brothers from the time I first saw them come up there and work in that timber. All I know is they sawed out that one boundary of timber and were there, I guess, four or five months.

I have seen boats hauling pig iron on New River. I know where the Boom Furnace was located. It was up on the left of
new River about two and a half or three miles from the
298 river on Little Reed Island. I have seen the Boom
Furnace in operation. I have seen pig iron from that furnace on long keel bottom boats on New River but never rode on any of these. I came back up on the river with them a piece at different times, starting from where I lived. I wasn't grown then, I was just on a kind of a pleasure trip with a man who was running the boat—a boy riding in the boat. My father's farm was five or six miles, five I think, below the mouth of Reed Island Creek where it enters into New River. At that point and other points on New River I would get into the empty boat as it came back and ride up with the men as far as I thought

I could walk back home. These boats were the same ones that hauled pig iron down the river. I don't remember exactly but it seems that I saw boats on New River hauling pig iron three or four years probably. I don't remember how many years. It usually took three men to operate the boat.

I knew a Mr. Goldsmith who ran a veneering plant in the town of Radford and sold him a lot of poplar logs, I guess twenty-five years ago, about 1910 or 1911. I rafted the logs down to his plant after cutting them and putting them in the river. They were put in the river about half a mile below the mouth of Mack's Creek, which used to go by the name of Owen's Ferry. I would think it was eighteen or twenty miles from the mouth of Mack's Creek where it empties into New River down to New Radford.

I suppose it is between twenty-five and thirty miles by the river from the mouth of Reed Island Creek down to Radford where the pig iron boats ran. Reed Island Creek is farther up the stream so that the logs were rafted something like twenty miles down to Radford. They said the logs got there. Anyway they paid me for them. I don't remember how large a stand of poplar I sold to Mr. Goldsmith but I expect it was five or six thousand feet. I cut the poplar in the bluff over there.

The witness testified upon Cross Examination as follows:

I don't know how long it took the raft of poplar logs to get to Radford. I think they busted up once. The man that took them down told me so.

The ferry boat that got away in the summer of 1931 came
299 from Mack's Creek. It was built at the mouth of Mack's Creek for the Linkous Ferry. I couldn't tell you how long it took to get that boat from the mouth of Mack's Creek to Linkous Ferry. I don't remember saying in November 1931 that it took all one day and part of a night and part of the next day to get the three miles to the ferry. It might have done it. I don't remember.

I never saw any of the pig iron in the bottom of the river which had been thrown out of the boats. I heard of it being thrown out. I don't think I ever saw boats loaded with pig iron hanging on the rocks. I never went down with these boats when they were loaded. I saw the boats but I don't remember seeing one hung on the rocks. It used one day going down to Radford with a boat loaded with pig iron from Reed Island and two days coming back. I don't remember how many of these boats were in operation.

I remember the hauling of iron ore from Clark's Bank to Breeden's Hill—Hiawassa. The ore was loaded on the boats

up at Allisonia where there is a ferry now. The ore was hauled down the river a couple of miles, I guess. I think that is what they call it from there to Hiawassa. They would unload the ore there and haul it by wagon over the Lead Mine Road to the furnace. I drove a team for Mr. Southern and hauled it by wagon.

I don't know just when this boating of iron stopped. I couldn't say that it stopped before the railroad was put in operation but it seems to me that it did. I am not positive about it. I don't remember though for certain.

The iron from Mack's Creek Furnace, Radford Furnace, was gotten to the railroad by hauling it to Dublin on wagons. The Mack's Creek Furnace was discontinued long before the railroad was built. I don't recall the year it finally went out of blast. It went out of blast and then was operated again for a little while. The first coke furnace was stopped before they built the railroad. There was a Mr. Putney come there and rebuilt the furnace and made a coke furnace out of it and worked it for two or three months and then went busted and quit. I think the former operation had been discontinued prior to the building of the Cripple Creek Railroad.

The witness testified upon Redirect Examination as follows:

I don't know of my own knowledge whether the furnace went out of operation at a designated time. I remember when it did stop but I don't know the date.

JAMES BREEDING testified upon Direct Examination as follows:

I was born on New River between what is known as Allisonia now and Hiawassa, in 1862, I think. I am seventy-four now. I have lived there on the same farm where I was born practically all my life except a few years during Woodrow Wilson's Administration when I was in Ohio. Our house is not much over forty yards from the river if it is that far. The river got up in it a time or two.

I have seen boats on New River. When I was a young man I boated ore for myself and Mr. Tom Mills which was shipped from the ore bank down to the Spencer Breeding Hill by keel bottom boat. The ore was secured at what was known as Clark's ore bank. It is right west of where I live, about a mile and a half. The farm where I live is just about at New River Bridge. The first house above the New River bridge, the railroad bridge across New River. The bridge, that is the one my farm is near, crosses New River near Spencer Breeding Hill just this side of Mack's Creek. The ore which I took from the Clark ore bank was hauled down to the river with a wagon and we boated it from

that wharf to the other one which was down at Spencer Breeding Hill, about two miles from Clark's Ferry. The boats Mr. Mills and I used were keel bottom boats. They were not flat boats. They had an oar behind to guide with. I don't really know how much ore one would carry. We would always load the boat down about four inches from the top until it would sink down about four inches from the top. Some said that the load was six or eight tons, some said more. We loaded it until we were afraid it would go down and then we quit. When the ore was unloaded at the river bank at Spencer Breeding Hill it went to Mack's Creek Furnace where it was made into pig iron, I believe. I have seen the ore made into pig iron.

Mills and I operated this boat or boats a right smart while—I couldn't state how long—a year or two—probably not two years. But we was there on the river a good while. I boated there as long as I could stay there and it would get bad weather,
of course. Sometimes we would have a bad rain, you
301 understand, and get so dark we couldn't see and we
would have to put ashore in the river to see how to run the boat through.

I know Boom Furnace, which was right up the river above our farm and the Mack's Creek Furnace—about three and a half miles above Mack's Creek Furnace, I guess. They boated ore from there down to the river. I have seen pig iron on boats from Boom Furnace but not ore. The pig iron was made at Boom Furnace. I have seen it made there. I have not seen it put on boats at that point but down on the river just below there. They would haul it to the river. I lived a little below the furnace and would see the boats come by loaded with pig iron.

Q. Over how long a period did you see boats carrying pig iron coming from above on the river?

A. I couldn't testify exactly how long.

Q. I understand you can't state exactly, but approximately?

A. Sometime, you know, and really I went with them myself down to Radford and I would get lonesome and I would feel bad and I would go myself. Sometimes I would feel like I wanted to go and I would go.

Q. Did you make that trip several times on the boat?

A. Yes.

Q. And the boats would be hauling pig iron to Radford?

A. I had no interest in it, no money in it or nothing.

Q. You just made the trip?

A. Yes.

Sometimes there would be four men on the boats. I don't know how far it is from Boom Furnace, where they would start

with the iron ore, to Radford but I think it is about three or four miles from where I live up to Boom Furnace and I reckon six or seven miles or something like that from where I live to Radford. I don't know how long these boats operated on New River carrying pig iron down to Radford. I wouldn't testify as to how many years boats carried pig iron down the river for I don't know but they were there some time. I wouldn't say that it was more than two or three years because I don't know.

If the river was up it would take us a very few hours to take the pig iron boats down to Radford from where
302 we got on the boats. If it was down, it would take several hours. We would come back in the boat pushed by man power. Oh, yes! We had a patch on our coats that we put the pole against. I had no interest down there but they put the pole against that.

I knew some of the men who operated these boats—I knew James Owen and then there was a man by the name of Odell, a man by the name of Clabe Lawson. There were several people there—Jeff Cox, I believe if I ain't awful bad fooled. Oh, Yes! I have seen these men operating the boats on the river which I had no interest in. I paid no attention to that. I didn't try to remember their names to testify in 1936.

Q. Have you seen anything else boated on this river?

A. Oh, yes. When I was quite a young fellow, right young boy grew up I heard some kind of music out in the river and I said to my mother, "What could that be?" She said, "That is that fellow on a raft." I said, "What is the raft?" She said, "A man that brought timber down the river." I said, "What is that he is blowing?" I went out and he had a weed, on old weed that he took off of the bank of the river and it was the most comical thing you ever heard in your life and that drawed my attention to look and he had these logs pinned together some way and nailed together some way or other.

Q. Some kind of weed music?

A. He had a weed blowing in it. I thought it was peculiar. That is how come I know about it.

Q. What we he carrying in that boat?

A. That was no boat, honey. That was what you call it—logs.

Q. A fleet of logs or rafts of logs?

A. Pinned together, just side by side, what they call a raft.

Q. And these logs were floating down the river?

A. Yes, sir.

Q. Did you see more than one raft of logs?

A. I saw several, but not a world of them.

In the early days up there we didn't have much roads. We had a road run near our house about six or eight or ten miles
303 know as the macadamized road that runs to Baltimore, I believe, but we had bad roads and we had to hire people by the day and make them pay the taxes.

I was right there and remember when the railroad bridge was built up there. The materials for building that bridge were hauled down the river and sometimes they hauled on a wagon. We owned a ferry there and I took our boat when I was a boy and took it down there and kept the engine in that boat to pump the water out of this cofferdam to put the dam in the river. No materials were hauled on that boat to put in it. They had a boat, a very big boat, in which they would put a heap of material and haul it down the river for the dam. This bridge was built down at Hiawassa at what is known as Spencer Breeding Hill, down below my house. The bridge crosses right on the corner of my father's place.

Q. Have you ever seen anything else carried on boats, any merchandise or any lumber?

A. Oh, no; not to amount to anything. I have saw lots of stuff go down on boats, but I mean not regular traffic of that kind.

Q. When did the boating of pig iron cease?

A. Well, I suppose when the furnace run out there they quit. They used to haul it down there pretty often.

Q. You mean down the river pretty often?

A. They went down pretty often. James Owen and these boys used to go down there from up there about Reed Island or Boom Furnace down the river.

Q. When the furnace closed up, then the boating ceased?

A. Why, sure. I have been there all my life.

Q. Mr. Breeding, I have one more question I want to ask you. Do you know about the Buck and Byllesby dams that are above you on the river?

A. I didn't understand you.

Q. Do you know about the dams that are built on the river?

A. I don't know much about them.

Q. Do you know about them being built and being there?

A. Oh, yes.

Q. You know they are there and above you?

304 A. I can tell from the water.

Q. How do you tell it?

A. It gets up and then goes down.

Q. Explain what you mean by saying that the water is up and then goes down. Tell the court?

A. Probably the morning—I don't know really about what part of the day, but sometimes we go to the mill at Allisonia and the fellow says, "We can't grind, ain't got no water," and then have to wait until the water comes on before they can grind.

Q. Have you seen this rise and fall of the water, this fluctuation around your farm?

A. It is every day.

Q. About what time in the day?

A. I believe it is in the morning. I think it is in the morning. I ain't sure.

Q. When the water is low, is it less than normal tide?

A. Well, the water is low, you know, and the sandbank comes out here where the stock drink water, and when it gets down they can't get to it.

Q. Can't get to the water?

A. No; they can't get to it. I live right at the river.

Q. Did you notice this water rise and fall in this way before the dam was built?

A. Well, it never did that. It used to freeze over very often when we would be there on the river, freeze over often, and after they put the dam in we didn't have much trouble. It goes out or in or something, but anyhow we don't have any bad ice like we had. We did have this year some bad ice, but it goes out and in.

Q. The fluctuations in the water have come since the da[illegible]ere put in, the change in the water?

A. I know one thing, that it don't freeze up like it did. It comes up and goes out, comes up and goes out.

305 The witness testified on Cross Examination as follows:

I was born on New River this side of Allisonia within forty yards of the river. I lived there all my life except when I was in Ohio. I owned a farm adjoining the place on which I lived. I lived in Pulaski after I came back from Ohio and then I moved on a farm where I was born and have been there ever since. The river makes a bend for several miles at Mack's Creek. It is a very short distance from Mack's Creek to Spencer Breeding Hill right where the ore was put across to Mack's Creek but to go around the river is a mile or two. I never hauled any of the iron from Mack's Creek Furnace. I just hauled ore down to make pig iron.

Q. When did Boom Furnace go out of blast?

A. I told you I couldn't tell that a while ago. I wouldn't be positive about Boom Furnace going out of blast but it would come in and then go out. My cousin superintended that.

Q. Did it go out of blast after or before the railroad was built up there?

A. No; it has been since the railroad was built that it went out of blast, I guess.

Q. I didn't understand?

A. I guess it has been since then. I knew how it was made there and I was there and saw the pig iron hauled from there.

Q. But you don't mean to say that you saw——

A. I wasn't positive as to those little things, but when I would testify to it, it would be the truth and would stand, too. It will stand, too.

Q. Do you remember when the railroad was built up there?

A. I certainly do.

Q. What year was it?

A. I don't know exactly what year, but I know how old I was at the time it was built there.

Q. Maybe we can compute it.

A. All right, sir; I was just sixteen years old and I am seventy-four at this time, and we kept all the boarders, as high as
306. twenty at a time, there. I was sixteen years old in May, and that railroad had two sections right there—Mills and Fairfax.

Q. That would make it the year 1878, Mr. Breeding?

A. Well, whenever I tell you because we kept the boarders there. We kept the head men there.

Q. I suppose you are not positive about that but it is the truth; is that it?

A. I am positive that is about my age because I run off from home at that time and they sent after me and that makes me a little more positive about it.

Q. Do you remember when the Government built the channel up there?

A. I certain do.

Q. How old were you then?

A. I don't know. My mother cooked for those people. I can give you some of the names.

Q. Was that before or after you had these boarders there working on the railroad?

A. I reckon it was before. I don't know but my mother cooked for them and I can give you the names of the men she cooked for. I don't know exactly. As I told you gentlemen, I wouldn't testify to an hour or day or nothing of the kind, but I am just testifying to what is a fact about it. My mother cooked for some men there, one bunch of them and some of them was at Hiawassa and some of them at Dublin, a man by the name of Wagner and a man by the name of Somers. I am just speaking about I was there and waited on Mother. I really don't

know, but I did help put up that bridge. I mean I done all I could, feeding the people. We kept eighteen regular boarders.

Q. Was this when the railroad or the channel was built?

A. When the railroad was built. We never kept those regular boarders when the channel was. There was just a few of them come and stayed with us.

Q. And which was first in point of time?

A. I don't know. I wouldn't swear nothing about that,
307 but we kept them there all right and when the railroad was built they had two sections at it. We kept the head men of the railroad, Bill O'Brien and Joe O'Brien and Fairfax come there once in a while and Mills would be there once in a while and considerable of them.

By the COURT:

Q. Do you remember the big flood of '78?

A. I certainly do. I was in it.

Q. Was this railroad built before or after that?

A. I suppose it was built before that, I reckon. I expect it was. I ain't sure now about that. There was a man lived with me by the name of Cowan and he was working with me that day and it was in September and we didn't know anything about this rain up the river and next morning we got up to fix the fire and heard something, I thought, splash against the boat. We kept boats there—a canoe—and I peeked out the window and it was up into the boats. I said, "Lord, get out of here. The water is up in the house," and we jumped up and by the time we got out it had got around the house. It come like the ocean and we got out of there too and it came up to the window, middle of the window—old-fashioned window. It come up to the middle of that, almost to the loft. This house was about, I suppose, eight feet, this room was. I am just guessing about that, but it was about to the ceiling. I wasn't here in the last fresh.

Q. You weren't here in Noah's fresh?

A. I didn't know nothing about that last fresh. That was when I was in Ohio.

Q. The large boat you spoke about, was that the boat rock was hauled from Howard's Ferry to the bridge piers?

A. I don't know. They come down the river. They had that boat. It was a very big flat boat and it got away from them and Mr. Fitzpatrick, the General Manager of the abutments, gave me $20 to swim to that boat and undo it and get it away from there. It got away and got down in the river and it was an enormous broad fellow. It wasn't like the boat we hauled ore on. It was a good boat like they have down here on the
308 Monongahela River—holds 100 or 200 tons.

Q. How did you get it back up?

A. We pulled it up.

Q. Did you have any trouble with it?

A. Oh, yes; we pulled it up. We had blocks and we would catch it along and take the pole and shove it out from the bank until the other fellow pulled. We got it up there.

Q. Just one other thing I want to get clear. Do I understand that that man on the raft was using that wind instrument to propel it with?

A. I told you I didn't know who he was, but he had the raft there and had that horn, and it drawed my attention to go and look at it and it was an old weed; yes.

J. E. OWEN testified upon Direct Examination as follows:

I reside on a farm in Hiawassa, Pulaski County, within fifty yards of the New River. I was seventy-four years old the 24th of March past. During my life I have lived in three places, mostly on the river. I was born a couple of miles from the river and lived there until I was two years old, then moved up the river near Allisonia. Then I moved down near Hiawassa and have been there since 1878.

I have seen boats on New River. The boats I remember best were the bateaux, the keel-bottom boats. I think they were sixty to sixty-five feet long and six to eight feet or seven feet across the top. I was one of the boatmen. I went on as a timekeeper on the river. We went mostly from Allisonia to New River Depot. I never went below New River Depot with a load of iron. I have been to Hinton by boat.

I went to Boom Furnace as a clerk in the store and perhaps two or three times a day I would run down to the furnace and weigh iron for the teams to haul down to Allisonia, where they put it on boats and took it to New River Depot.

I went down the river on boats loaded with pig iron many times as far as New River bridge. There the iron was unloaded, weighed, hauled up to the railroad depot, and loaded on to the the cars of the Norfolk & Western Railroad. I shipped iron to R. C. Hoffman & Company, Baltimore, Maryland.

309 I knew Major Graham and John W. Robinson, who were owners of the Boone Furnace. They had a company, I think, called the Reed Island Iron Company, which had four boats. These were bateaux used for transporting iron down New River. I remember that one time on the return trip coming up the river we brought back some bacon. It might have been a thousand pounds. At that time I was a foreman on the boat. Bob Porter was foreman before that time.

I worked on the river near Linkous Ferry to Hiawassa or Jones Ford clearing the channel on New River for the government.

This work consisted of cutting chutes through the ledges. The ledges were cut to increase the business on the river of transporting iron and things like that. Without this having been done you could not have boated at all.

Pig iron was not carried down the river prior to the cutting through of these ledges. I don't think pig iron was carried down the river until after that.

Iron ore was not hauled down the river in boats on New River except from Clark's ore bank I would say two or three miles down the river and unloaded at Hiawassa and hauled from there to the old Radford Furnace on Mack's Creek. It was boated down and across something like two and a half to three miles.

I have noticed changes in the river, so far as its flow is concerned, since the construction of the Buck and Byllesby dams. When we forded the river at Jones Ford above my house and went to mill with a load of wheat, it seemed that the river was much lower in the morning than it was in the evening. When we came back in the evening it had risen something like a foot and a half or two feet. In the morning it would be down again.

Pig iron was hauled altogether on wagons from Boone Furnace, as far as I remember, to Allisonia and to Howard's Ferry, that is still higher, to the mouth of Reed Island. After the iron was made at the furnace it was taken to New River. Some was taken to Dublin on wagon and shipped from there to the same company. I can't say what percentage was taken to Dublin. I loaded iron on cars there and also at New River. I don't know whether more was shipped by wagon to Dublin than was shipped by boat to New River Depot. I can't exactly state, but I was more interested in the boats. I was put in there as foreman and timekeeper.

After we got through with the work of clearing the channel we took the government boats to Hinton, West Virginia.
310 They were all kinds of boats, tool boats, flat-bottom and keel-bottom boats. The bateaux and some flat boats were the longest. I could not say what width the largest flat boat was—it was wider than a bateau.

I went with those boats all the way down to Hinton. There were four bateaux. I remember their names. I don't remember how many flat boats there were. Some were tool boats to carry tools in, some were skiffs, and some were canoes. When the government cleaned out the sluices it had commissaries here and there on the river and supplies were carried for the men who did work of all kinds. These boats carried food and powder and everything down the river.

It took us six or eight days to make the trip down to Hinton. We did not have the boats at one place but we had to go along

and gather them up all along. I don't remember how low down on the river they were. I remember some of the men who were on these boats which went down the river—M. P. O'Dell, a white man, Bob Whitt, J. W. Crowell, Billy O'Dell, Tommy O'Dell, and maybe French O'Dell, and a fellow named Lawson.

I don't think I can estimate how many tons of pig iron were shipped a year from the Boone Furnace to New River Depot. We aimed to make two trips a week on those boats. We would go down on one day and it would take us two days to shove the boats back. I can't tell you how many boats there were on each trip, sometimes four and sometimes three. It seems to me we had something like six ton anyway, so that if we had four boats there would be twenty-four tons a trip. We made two trips a week if we could, but sometimes we couldn't. The men would fall out, a good many of them. Some worried over it and like that and wanted to rest. We had some trouble getting the boats down the river, but not much. We generally got through in a day. All the men knew the channel.

When I shipped a carload of this pig iron to Baltimore, I would get a bill of lading from the depot for the shipment.

The witness on Cross Examination testified as follows:

I am about a second cousin of Major Tipton. I used to be a Deputy Marshal.

As I remember, Boone Furnace, or the Reed Island Iron Company, owned four bateaux. I remember some of the names of these boats—"Old Artie," "Clara," "Bell," and maybe the
311 other was "Stella." I'm not right positive of that. I think I was second foreman of boats, the second man who had charge of the iron boating to Radford. Bob Porter preceded me as foreman. I think he quit or was discharged, or something like that.

Q. Did he make a success of the iron boating?

A. I don't know; maybe not. I am not sure; anyhow he quit or was discharged. I don't remember anything about how he got through with it. I really didn't know; I had no chance to know.

Q. When was it your cousin, Major Tipton, sent you to New River Bridge to get the experienced boatmen?

A. Sir?

Q. I said when was it your cousin, Major Tipton, sent you to New River to get the experienced boatmen?

A. I don't know that; but he did, and got two or three boatmen down there, three boatmen from down there.

Q. Did they improve the situation at all?

A. What did you say?

Q. Did they make a success of the boating?

A. They never done as well as some men we had up there.

Q. What was the difficulty about that boating; what was the trouble about it?

A. They were not as well experienced and I suppose the water was rougher up there.

Q. That was pretty expensive iron, wasn't it?

A. Yes; and they had been boating where the river was not so rough.

Q. The iron was right costly to manufacture, wasn't it, that charcoal iron?

A. Yes; I think so.

Q. Did the men ever lighten their boats as they went down the river?

A. Yes; they done that some.

Q. Didn't they do that considerably?

A. I can't tell how much, but that is one thing I got in there for.

Q. To watch them?

A. Yes, sir; to keep the boatmen from lightening their loads.

312 Q. When would they lighten their boats?

A. When would they do that?

Q. Yes.

A. Well, if the river was low you know it was more difficult to get through those shallow places, those chutes that were cut out.

Q. When they would run on to a rock they would proceed to throw the iron out until they got off, is that it?

A. Yes, sir; that is it.

Q. And you went along to keep them from doing that?

A. Yes, sir.

Q. And that throwing out of the iron was why the boating wasn't a success, and isn't that what your cousin put you there for?

A. Yes, sir; to watch them. It made it easier work on the men.

Q. It made the iron weigh less when it got to New River bridge?

A. Yes, sir.

Q. You say you could get through all right if you knew the channel, I believed?

A. Yes, sir; some boatmen were more experienced than others and knew the running, the flow of the water.

Q. But you always on every trip you took, unless you had a particularly high tide, you always ran on a rock somewhere or had some kind of trouble?

A. Sometimes, if the tide was too high it was as dangerous as any time, because they couldn't follow the chutes then.

Q. Was it worse boating when they couldn't follow the chutes?

A. It was more danger. The boatmen knew the dangerous rocks all the way, you might say, between those rivers, where they were cut through, the natural way they were liable to run on the rock, and if the river was up a little and maybe muddy it was dangerous that way.

Q. Wouldn't a boat always have some trouble on a trip to New River, wouldn't it run on to a rock somewhere?

A. We had some trouble one time.

Q. Just one time?

313 A. That is all I remember.

Q. What was that trouble?

A. Well, the boat struck a rock and cut a hole in it.

Q. That boat broke, didn't it?

A. Broke a hole in it, and we grabbed up an old quilt or something like that and poked it in it and went to the bank and nailed some plank on it, and went on to New River bridge that night.

Q. Wasn't there always minor difficulties in going down the river of getting on a rock, that was a frequent thing, wasn't it?

A. Oh, yes.

I can't tell you how long the boating of iron from Boone Furnace to Radford continued. It seems to me I worked on it part of two years, mostly in the summer season. I don't think I boated much in the winter because of ice and the river was eddy. The boating might have been discontinued after the railroad was built. I don't remember that the boating stopped before the railroad was built up Cripple Creek. I don't remember that iron was hauled away from Boone Furnace to Pulaski after the boating discontinued. I can remember of it going to Dublin. I think the iron from Mack's Creek was hauled to Dublin. I don't know anything about that. I have seen the wagons hauling it there, and even going across on the ice at the Cat Hole at Mack's Creek. I never had anything to do with the Radford Company.

I don't know whether iron was boated from Mack's Creek Furnace, the Radford Furnace, from Mack's Creek to Radford, Montgomery County, during the time I did this boating. I never saw any other boats hauling iron.

I don't think I ever hauled any ore from Hiawassa to the Radford Furnace. I know that some was hauled by wagon across Breeding's Hollow over the Lead Mine road. A flat-

bottom boat must have been used for shipping ore from Clark ore bank. I don't remember what kind of boats were used. I don't think a bateau, a keel boat, could have taken a load of iron ore down the river to Max furnace before the channel was out. I think there was more water in the river at that time than there is now.

Q. I understood you to say those bateaux could not operate until the channel was cut?

314 A. If you took that iron ore down the river to the mouth of Mack's Creek it would have been some little distance to haul it from there up to the furnace, very near as far as it would have been from where it was taken, that might have been the reason why; I don't remember if that was before the channel was cut. I don't think it would have been safe to have took it down the river to Mack's Creek.

I think I took these Government boats down to Hinton as soon as they finished the work of cutting the channel. I don't remember, but I think we took the boats to Hinton before I boated the iron from Boone Furnace. On that trip to Hinton I think I started the boats from about Foster Falls. We collected boats all the way down to the big falls between Gile and Pulaski and maybe below there—I don't remember how far down. Some of these boats might have been washed down river in the flood of 1878. Some of them did get loose and wash down the river.

I don't think I was working on the Government improvement of the channel at the time of the 1878 flood. I didn't work on that channel very long. As to the time of the year I went on that trip, I can't remember, but it was a little cool. I remember that because we had to lay out many times. The water was high; there was a right smart tide. The Government boats were not working down there at that time. Some of the boats might have been washed farther down the river by a freshet. But the boats we took down we started with them and we got some at Hematite, above Foster Falls. One flat-bottom boat we turned loose and let go. It struck the bank and went under. The water was pretty deep at Foster Falls. We got the boat out that went over Foster Falls. There was nothing in the boat to start with; it was just a tool boat. I went down in a bateau. All of us went on along together and helped load and stop and like that.

I was not at Hinton when those boats you speak of were sold at auction. I came right away and went back home across Dry River and walked across Peter's Mountain—something like fifteen miles. We did not take a boat up because we were done with the boats then.

It took six or eight days to make that trip to the best of my recollection. I don't remember going through McCoy Falls. I recall a falls that some of the boatmen wouldn't go through.
315 They wouldn't go through the main chute, which was a natural chute, I think; I don't think that place was ever cleaned out. I don't know the name of that falls. I have been told it was a line between Gil s and Pulaski. I can remember that when we got down there, they stopped above those big falls. There was a colored man, John Johnson, that had been boating with me all along, and a slave that belonged to my people. He asked those experienced boatmen I talked about a while ago that came from Radford, "Maybe you had better run these boats through that notch, you are acquainted with it, and been going through it." That was Jim Hale or Whit Tate. He said "Any negro that claims to be a boatman ought to run his own boat." And John Johnson said, "Get back there, Jimmy, I can run a boat where any damn negro can run a boat." And we did it and went through. Had to go through sort of bias and two rocks in there the boatmen called the "twin sisters" that were dangerous rocks. A colored man and a white man had got drowned there, they were loaded with charcoal pretty heavy, and the boat went over and went under. That negro that wouldn't run the boat through, that claimed to be an experienced boatman down there, he hung up. That was Whit Tate or Jim Hale, one or the other. I think the boats went through all right without help. Some went out in the river with small boats, maybe flatboats, and didn't follow the sluice.

I don't think I remember who was in charge of taking the government boats down to Hinton. I believe the government employed me to go down on this trip. They wanted men that had experience in it and we had been boating up there and they got all the experienced men they could; but I cannot call over all of those names.

I don't think I did this iron boating before taking the government property down to Hinton. The government property was taken down there when we got through cleaning out the sluices. I had lived on the river all my life and those experienced boatmen that were gotten to go on that trip were people who had lived on the river all of their lives—fishermen and men who understood the water. I never went into West Virginia on a boat except this time.

The witness on Redirect Examination testified as follows:

Yes; I said I was put in the job of watching these men
316 to see that they did not throw this pig iron away. They did not throw much away. We gathered it up afterwards, maybe on the next trip or something like that. We lost very

little in a load. They would lay out a pig of iron or maybe two or something like that. Nothing to amount to much.

All of these boats on this trip got down to Hinton. There were more than twenty. There had been a lot of work done all along there and there was canoes and skiffs. I could not tell you how much of the time was spent picking up boats along the way. We just went along and the men gathered in the property all the way down.

I did not see that colored man and white man drowned. That may have happened years before. I never heard of anybody else being drowned running the boats. I just heard about these men from an old colored lady.

Q. Counsel on the other side brought out the fact that during some part of the year you did not run these boats carrying pig iron. What part of the year would that be?

A. I cannot tell you about that. If the weather was suitable we just went right on with it.

Q. Did you run them in the winter as well as the summer?

A. If it was not too cold and not too much ice in the river or something like that, we went on.

Yes; the river did freeze over sometimes. Sometimes it would freeze over and stay that way until spring—I don't know how many months. I can remember when they hauled iron across Mack's Creek when it must have been frozen over perhaps a month. I think that was as long as I remember the river would be frozen over. There would come a little warm spell and a big freshet which would break up the ice and wash it down. In some years it did not freeze over.

The witness on Recross Examination testified as follows:

I hauled iron across the river on the ice from the Radford Company, Mack's Creek. It might have been more than a month and it might have been less.

I spoke about the men falling out on these trips when we were boating iron. They just gave up their jobs and would not work any more because their shoulders got sore or something like that. It was a right tough job. It took a good, experienced, active man of pretty good strength.

317 J. W. CROWELL, on Direct Examination, testified as follows:

I live at Pulaski City, Virginia. I was born in Pulaski County on what is called Southern Branch on the east side of New River about a mile and a half above Mack's Creek Furnace, a little over half a mile from New River. I did not live there very long. My mother moved back over on the other side of

the river when I was too little to tell where to. When I was six years old we moved down across the river about three-fourths of a mile, perhaps a mile, above Owen's Ferry at Mack's Creek, right up there above there. I lived there for two or three years. Then we moved down the river about three-quarters of a mile above Linkous Ferry.

We moved down there in a keel bottom boat when I was seven years old. That is the first time I ever saw a keel bottom boat because I was too little. I am seventy-five years old now. They took the family and family goods in the boat. We went to about three-quarters of a mile above the mouth of Mack's Creek or about three-quarters of a mile from Linkous Ferry. It was further than four or five miles, but I couldn't say how many miles without looking at the map. That was 53 years ago and I can't remember.

We stayed down there two years, and then Allen Hurst, my mother's brother, sent a mule team down to where we were next to the ferry and moved us back up. We moved down to what was called the Alex Cook place. He sold the place and went west and we went to live down there. We stayed there two years, then we came back up here, a mile or probably a mile and a half.

I have lived nearly all of my life along New River. I have never lived in Radford but always above Radford on New River. I have never lived down as far as Dunkert's Bottom. I don't know just where Dunkert's Bottom is. That place I moved to above Linkous Ferry is as far down that way as I have ever lived.

I have seen keel bottom boats on the river, and I have also run a derrick boat on the river and seen another derrick boat there. The derrick boat I ran was right wide on the bottom. It had a top like a ferry boat but was not quite as long as a ferry boat. There was a derrick on top of it which we turned around when we were working at opening those channels. When there was a rock there we would catch hold of it and throw it out of the way with the derrick. This derrick boat was used by the government but I was not working for the government then, only taking them down when they broke up at the upper end.

318 Q. (Interrupting.) One minute, what do you mean by broke up?

A. The Government quit cutting the channel.

The government quit cutting the channel pretty close to 50 or 52 years ago. They brought everything down to Hinton, West Virginia, so they said, to sell them all because they had done cutting out the channel. I remember that I ran the big boat down there at that time. I got with them just below the mouth of Mack's Creek where the Mack's Furnace is. I told them to get in a keel bottom boat. It was leaking and I put two men in there

to get the water out. Then we ran that keel bottom boat down a little ways. There was so much water coming in they could not keep it out, and I said we might as well leave it here. They said "The damn thing is no account any way, let it stay there, and let us get on the big boat." I couldn't tell exactly where I got on the big boat, but didn't run the keel-bottom boat very long because I couldn't keep the water out of it. These two men couldn't keep the water out. The keel-bottom boat was an old one.

I went down to Hinton with these boats. I drove the big derrick boat. It was as big as the ferry that takes wagons over. It was wide that way (indicating), but it was not quite as long as these big ferry boats. I imagine it was two and a half times its width and that it was 20 or 30 feet long. It must have been ten or twelve feet wide. I could not tell you exactly the spot from which I took the boat. It was above Radford down this side of Mack's Creek. This was the boat that was leaking so bad.

I don't know exactly how many other boats went along, a right smart bunch of them, six or seven of them. They were all keel bottom boats except the derrick boat which I had. I guess there were about eighteen or twenty men in the party. I had two with me on the big boat.

Q. Did you ever see any keel boats on the river? I believe I asked you that question before.

A. Yes, sir.

Q. Did you ever investigate or know what they were carrying?

A. No; I never made any investigation as to what they were carrying. I just naturally heard it any way, that a lot of
319. them came from the Boom Furnace and they were hauling pig iron to New River. They had been passing up and down the creek and there was one old fellow named Scott ran one all the time. There was no railroad up there so that they could get in their truck and he got anything he could and he was one that lived there and worked up and down the river.

Q. What did these boats carry, if you know?

A. I am not able to tell you just exactly what they did carry, but I have seen them, I would look at them and I have seen them loaded with shingles, or it looked to be that to me, but I wasn't right at them. I just looked at them along the river.

Q. Did you ever see any of these boats down as far as Radford or the New River Bridge?

A. No, sir; I never was down that way only when I went to Hinton. I went from there to Hinton, but I don't know what there was up there.

Mr. J. E. Owen was not on the boat I was driving, but he and his brother, John I., were in the crowd.

I live now at Pulaski City. I have been near the river recently. I go to the river about every other week regularly. I have an orchard there. I have noticed a change in the rise and fall of the tide of that river. I looked at it when I was fishing. You can tell where it runs on the sand and when it comes down, or when they shut down or run all day and then shut the dam off at night. When they shut it down the water is down and soon in the morning then where we lived it is low, way down, I would say as far as up there (indicating) on the sand bank and then it runs down that far (indicating) and then in the afternoon it comes back to where it was. This is down stream with respect to the Buck and Byllesby Dam next to Mack's Creek.

I have seen rafts of logs coming down the river along in the Mack's Creek section and below that, they took up a raft. I gathered up a load of poplar in that country and got it down there and I just let it go to Radford. They had a place there where they caught the logs. I put them out in the river and they taken them out at Radford.

The witness on Cross Examination testified as follows:

320 I don't think I was ever on Dave Scott's boat except that one trip. I was just a baby then. After that I saw the boat going up and down the river along about Mack's Creek. I remember the name Armstrong but I never knew Ed Armstrong personally. I was too young for that.

There was a log boom at Radford where they caught the logs. That was this side of the main part of the town on the east and below the railroad bridge, I think. And I believe it was above the highway bridge. I forget the old fellow's name. He was buying poplar logs and he got lots of it, but I forget his name. I cannot remember everything that way. The logs were fastened together and there was a wire at this end (indicating) going back to the bank. I don't think the boom extended all the way across the river. You had to drive logs into it. I went down on the logs; I drove them in there, what I taken down that time. My raft tore up. I started on the raft and it come apart but I got on those two logs and couldn't handle them that way well, and then I got along behind them and drove them back where they was. I can't tell exactly what year that was. It was after 1888, when I got married. I would have to have something to go by to tell about that. I guess it was in 1893 or 1894, quite a few years after I was married. It was after 1888 when I got married. I think it was something like in 1898 or 1894. If there was something to help but I do not know how to help in a case like this.

A. S. BREEDING, on Direct Examination, testified as follows:

I live at Parrott on the New River road a little below Belspring about two miles yon side of Belspring. I was born at Hiwassee. I lived there until I was about nine years old. Then I moved to Raleigh County for one year, and then I moved back here from Raleigh County, West Virginia. From there I went to Dunkert's Bottoms and lived there until I was twenty-two years old.

The Appalachian Electric Power Company is going to put a dam at the lower end of Dunkert's Bottoms. Dunkert's Bottoms is above the dam site.

I have been on New River on a boat. I was raised there. I helped to run boats on the river. At that time we was boating pig iron from Reed Island to New River bridge. John Ed Gilliam was the master of the boat. He had ten boats and
321 another fellow had eight, so there were eighteen boats on the river. Some called them keel bottoms and some called them bateaux. I couldn't tell you exactly their size. They ran from seventy to eighty feet in length and were about eight or ten feet across the top.

I ran from New River Depot to Reed Island and back, we was boating, carrying pig iron to the railroad. Part of the pig iron came from Reed Island Furnace and part from Mack Creek Furnace. I boated pig iron just one summer. We did not have much trouble getting down the river but sometimes we had very hard scrambling getting back. We moved the boats by man power.

I have seen lumber on boats going down the river and also grain.

We took the pig iron to New River Depot and unloaded it there on the wharf. We had a dock there. I did not see it carried to the railroad cars. I paid no attention to that.

Q. Why didn't you work longer than six months boating pig iron down the river?

A. They had put the road in then.

Q. What road?

A. The railroad from Pulaski to Ivanhoe. When that road went in there, that cut out all that work.

Q. They stopped shipping pig iron on the boats?

A. Yes, sir; you could ship it on the railroad as cheap as you could on the river.

I rafted lumber on the river from Have Howe's at Dunkert's Bottoms to Wallace Hodge's mill. I did not boat lumber down there; I did raft lumber there.

I operated sawmills on the river at Belspring and here and below Lurich's. Belspring is six or eight miles below Radford. We got logs out of the mountains. None of them came down the river.

In the government work of improving the channel of the river, I helped clean out the channel at Hinton and at New River, from Hinton to Warford at the Bottoms; that is where we stopped. Up here I quit work at Woolwine's Falls. That is as far as I worked up the river. The channel we cut in the river at Hinton was fifty feet wide and two feet two inches deep. The channel up here was thirty feet wide and two feet deep.

I cut ties for the railroads lots of places. We put on ten
322 thousand for New River Road when it was first built. We put them on at Ingle's Ferry and rafted them down New River to New River Bridge. I cut other ties which we rafted down the river and cut still others, but we never rafted any more.

I also cut ties other places on the River—Back Creek and Belspring—and I sawmilled once on Dry Branch. We did not ship any of these ties on the water. We hauled them to the railroad and they were shipped there.

The witness on Cross-Examination testified as follows:

John Ed Gilliam was in charge of the boats that I worked on which was carrying pig iron down the river. There were two gangs for these boats. John Ed Gilliam looked after ten and another man, whose name I have forgotten, looked after the other eight.

Me and John Kanode ran on some of the boats but we would not run in that gang. Stuart Rollins rode with me and the only boating that me and John Kanode done was from Have Howe's to New River. And we rafted some too. Stuart Rollins and I did the shoving. Tom Turner was the steersman. There were two to steer and two to shove.

There were three men in a boat and two captains, making fifty-six men on the eighteen boats. That was all. We would go up the river and get the iron from both the Boom Furnace and Big Reed Island Creek, the mouth of Big Reed Island Creek. That is where we loaded the iron. We would come and get some more at the Radford Furnace. Whenever they stopped at a place, we would go and get a load. We could not mix up the ore. If we went for iron we didn't look for anything else, and if we couldn't find any we came back. We went to the Boom Furnace for iron whenever they had it up there ready for us. We would go to the mouth of the creek and get it, and if it was at the other place we would go and get it there. If the iron was ready for us our captain would let us know. I don't know who told him.

Ed Gilliam lived at New River. I suppose he was working for the iron companies then looking after boating the iron down. I don't remember exactly, but it was something near sixty years ago that we did the iron boating. I was about seventeen years old. Lord, yes, it was when I run on the boats that
323 year. It was done before the freshet of 1878.

I don't know what became of the eighteen boats. Some of them might have washed down the river. A lot of them didn't because in 1878 we were working on them. When I quit boating these boats of our crew were left at New River and I was at Dunkert's Bottoms, so I don't know what became of them. I have seen them on the river since then, but not boating iron.

I remember testifying on Cross-Examination at Radford this winter, answering, "No, sir. The boats left here when the big freshet in 1878 come" to your question "did you boat any after that channel was cleaned out up there." I was speaking of the government boats. Also, when I answered "They left here and never worked no more after the big freshet come in '78" I was speaking of the government boats. In answer to the question whether I testified "I know what I am talking about, if I did not I would not tell it" my answer is I testified that the government boats went back to Hinton. I was talking about the government boats, not the bateau boats, when I testified, "No, sir; the boats left here when that big freshet come in 1878—when the big freshet in '78 come. They left here and never worked any more after the big freshet came in 1878. I know what I am talking about, if I did not I would not tell it." The government boats were taken down there and did not work any more after the freshet. Part of them was brought down in the big freshet, and these keel-bottom boats was scattered helter and skelter on the river after we quit work.

They did not boat iron after the big freshet. I left there before that and went to sawmilling. I was twenty-three years old then. I was born in 1860 on the 29th of February. I went sawmilling back in Cloyd's Mountain first. I sawmilled on the river at Belspring on both sides of the river over at McCoy.

All the boating that me and John Kanode did was from Have Howe's to New River—we used to raft some there. I bought the logs from Have Howe's and rafted them and sold them to Hodges. I had a bateau boat which I think belonged to Have Howe. I couldn't tell you what year that was, but it was before I went to sawmilling. I think it was after we hauled the iron, but I will not be positive about that.

The two men besides me who were boating iron were
324 Tom Turner and Stuart Rollins. We changed along. We didn't work all the time—sometimes a man would be off. These were my regular men.

Q. Who were your regular men?

A. Those were my regular men.

Q. I will ask you if this is the way you testified on cross-examination at Radford—if these were the answers that you gave: I asked you: "You say there were two gangs on these boats?"; "A. Yes, sir. Q. Who operated them—who was the head of the other section?—A. I forget the name of the eight boat gang captain. I think it was Tom Tate from Christiantown up here. Q. Who was the captain of your particular boat?—A. John Ed Gilliam. No one was of that particular boat. He run all of the ten. Q. Who steered your boat?—A. Harry Tate; he drowned down here in the Big Falls on a load of coal. Q. Who else was on your boat?—A. At different times, when I was shoving, first one and then the other. Q. My regular men were John Kanode and Stewart Riley." Did you so testify at Radford?

A. I don't think I told John Kanode was my regular man on the boat.

Q. What is that?

A. I said I don't think I told that John Kanode was my regular man on the boat—boating iron. Me and John boated there where I told you, but when we boated there, the other men was with me.

Q. You were talking about boating iron when you said that John Kanode was your regular man, weren't you?

A. (The witness does not answer.)

Q. Do you deny the fact that you testified as this describes here—as it is written and as I read it to you?

A. You talked awhile like these folks here—that they was boating to Hinton. I told you the Government boats went to Hinton, and you can get John Kanode or anybody else that knows back there to state whether or not I am telling the straight of it here—as straight as I can.

Q. That is what we did the last time and we got something very interesting out of Kanode. Did you testify this way when your depositions were taken at Radford?

325 A. (The witness does not answer.)

Q. Did you testify as I have read to you?

A. You got what I testified there, ain't you?

Q. You don't claim that it is incorrectly written, do you?

A. No, sir; I ain't claiming that at all.

Q. That has been a right long time ago, hasn't it?

A. I would say it had been 60 years.

Q. Your mind sort of gets kind of slowed up, doesn't it?

A. It has been long enough for fellows I rode on the boats with.

Q. You forget what you said in Radford, do you?

A. John Kanode has misunderstood me, or you one, because I did not shove the bateau boat above Have Howe's with John Kanode in my life.

Q. You said he was your regular man?

A. He was down here, but not up there. Me and him ran together down here and boated and rafted, but we never did run up any of the headwaters on a boat.

Q. Do you mean to tell the Court that——

A. (Interrupting). I mean to tell you as near as I know how.

Q. Do you mean to tell the Court that John Kanode——

A. (Interrupting.) I mean to tell you what I done.

Q. Do you mean to tell the Court that John Kanode ran a bateau to Have Howe's or about Ingles' Falls, hauling lumber?

A. I never hauled no lumber down there with him. I rafted lumber in logs, but not sawed lumber.

Q. Did you boat the logs?

A. No, sir; I rafted them.

Q. Did you do any boating with John Kanode?.

A. We boated, hauling wheat and stuff like that for Have Howe and boated stuff back there for him.

Q. And that was when John Kanode boated with you?

A. Yes, sir.

Q. You say that John Kanode boated with you at Have Howe's, from Howe's to Radford and New River Bridge?

A. Yes, sir.

326 Q. And that you never boated anywhere else with him?

A. I said no; I never boated anywhere else with him.

Howe owned part of the Dunkert's Bottoms, which are about five or six miles, I believe, above New River Depot, where the railroad bridge crosses above Radford. There was no boating of iron after the 1878 freshet that I knew anything about.

Q. How was the boating up there above where the channel had been cut? Was the channel cut all the way up there?

A. No, sir; it wasn't; nothing only they had cleaned it out for those boats, just a place, you know.

Q. How did you get over the ledges and falls with your boat?

A. When the water was deep enough you had to pick your water and go where the water was deep enough to run.

Q. Was there always water enough in the river to run?

A. Not always. Sometimes the river was too low to run.

Q. Did you have to have a tide in the river to run?

A. Had to have some tide.

Q. About how many feet of tide?

A. A foot of tide would be a great big thing to a bateau boat.

Q. Did you have to have a foot of tide to run up there?

A. We had to have something like a winter tide.

Q. Is that about a foot above what you call normal water?

A. In the dry time the water goes down and you can't run the boats and when you have a wet season you can run them then.

Q. Ordinarily through the summer could you run those boats up there?

A. Yes, sir; and when they would come along dry spells we couldn't run them and if we had too much tide it would make it too hard shoving.

I said on direct examination that I think the building of the railroad was what discontinued the running of the boats.

The keel-bottom boats that I worked on were not washed down the river by the 1878 flood. They were tied up at different places along the river. One or two of them, I think, got destroyed, but there were not but one or two of them that I ever had any account of that were destroyed. They were not loaded
327 with anything at the time. They were not hauling iron at the time of the flood of '78. They had quit before that time. I don't know whether the Cripple Creek Railroad was being built at that time or not. I could not say, but we didn't run all the time when the Cripple Creek road was not there.

We didn't run boats regularly all the time. We didn't have any iron to boat. I can't tell you exactly what stopped the boating of iron that I was connected with. I stopped myself. I just quit and went to work on the farm. I couldn't give you the date when I stopped. I don't remember whether it was before the big freshet of '78 or not. I can't tell you exactly whether I had stopped hauling iron on boats before the Cripple Creek Railroad was put into operation. I never hauled any iron after 1878 and never saw any hauled.

The witness on Redirect Examination testified as follows:

Q. Did I understand you to say in answer to questions from counsel that after 1878 you didn't follow the boating of pig iron so that you didn't know whether it was continuing or not? Am I correct in that?

A. I didn't follow it; no, sir.

Q. So that you didn't know whether they were continuing hauling pig iron; is that right?

A. I never saw them any more after that. I don't know what they were doing.

A. W. SNYDER on direct examination testified as follows:

I live at Belsprings, about six or seven miles below Radford, on New River. I was born in Montgomery County about a half mile from New River. I have always lived in that vicinity—

always near New River but at different places. I am 81 years old. I was born in 1855.

I remember the Civil War and saw boats on New River at about that time. They were running along down where we lived on the river about Eggleston. We lived about a half-mile from the river then. The boats ran along about where we lived between Radford and Eggleston and the Narrows. They were keel-bottom boats. I think they was about 75 and 80 feet long
328 and about 8 or 10 feet wide at the top. They had all kinds of stuff in them for the Confederate soldiers—all kinds of rations for the men, the Confederate soldiers who were stationed at the Narrows, which is on the river down below Eggleston just this side of Glen Lyn in Virginia. I have been to Narrows.

Q. Over how long a period did you see these boats operating, carrying provisions for the Confederate soldiers?

A. About four years.

Q. Did you see boats coming back up the river also?

A. Yes, sir; they come back.

Q. Did you know any one who operated any of these boats?

A. Yes, sir.

Q. Who were they?

A. Well, there was two men by the name of Keister. They are dead now. My daddy was on there.

Q. Your father was on there?

A. Yes, sir.

Q. He operated one of these boats, did he?

A. No; he just worked as a hand.

Q. Do you know any boats on New River going below the Narrows, further down the river at any time?

A. After the Civil War?

Q. I am speaking now after the Civil War?

A. They told me they went on to Hinton.

Mr. Abbott. We move to strike that out.

Q. Was it your father who operated on the boats?

A. Of course I never seen that. My father was on there. I never seen that but they went down there to bring stuff back, you know, take produce down and trade it at that time and bring it back.

Q. You would see the boats leave with your father on them?

A. Yes.

Q. What would the boats have on them?

A. Have all kinds of flour and barrels.

Q. Produce?

329 A. Yes, sir; chickens, eggs.

Q. How soon would your father come back after he had left on one of these trips?

A. It would take about a week.

Q. When he left Eggleston and that vicinity, was he going down the river on the boat?

A. Yes.

Q. And when the boat returned it would come back up the river in about a week?

A. Yes.

Q. Would anything come back on the boats?

A. They would bring some stuff back that they traded the produce for, I remember they hauled back molasses from Hinton in barrels, you know, and sugar and coffee.

Q. Over how long a period did these boats run down to Hinton that your father worked on?

A. About ten or twelve years, I think.

Q. A period of about ten or twelve years?

A. Yes.

Q. Where did the boats start from when they went in the direction of Hinton? Where did they start from, from what point?

A. From the New River bridge.

Q. Here at Radford?

A. Yes, sir.

Q. They came up above your farm then?

A. Yes.

Q. And how far was it from your farm near Eggleston to the New River bridge, a rough estimate?

A. I expect it was some twenty miles around the river.

Q. Boats that your father was on then would start at New River bridge and go to Hinton?

A. Yes.

330 Q. And come from Hinton back to New River bridge?

A. Yes.

Mr. ABBOTT. He continues to lead the witness and to get hearsay evidence in the record.

The COURT. Mr. Abbott, as far as the hearsay feature of it is concerned, there are certain things that can only be proven by hearsay. Suppose some one would ask you about where your older brother had gone to college and he had gone to Princeton. You may not have gone to Princeton, and you may never have seen him when he was at Princeton. Certainly you would be able, if testifying, to say where he had gone.

Mr. ABBOTT. If that fact were material?

The COURT. Certainly. Some things can only be proven that way, particularly things of this nature. I do think Mr. Williams is leading the witness more than he should.

Mr. WILLIAMS. I don't want to consciously do that, but with a man of this age and with facts with which I know he is familiar, where his father left on a boat, I feel that I am not transgressing the rule and I don't wish to transgress the rule at all.

Mr. ABBOTT. May it be understood that we object to all hearsay in the record and except for that reason so it will not have to be repeated?

The COURT. All right.

Mr. WILLIAMS. I am seeking not to lead the witness. I don't think I am establishing any fact that is not well known in the community.

Mr. ABBOTT. Let your witness do it and not you.

Mr. WILLIAMS. Your ability to testify on cross-examination has been very marked and I must compliment you. You have been gifted today.

By Mr. WILLIAMS:

Q. One other question, Mr. Snyder: Did the boating tend to cease after a certain number of years?

A. Yes, sir.

Q. When was that?

A. I don't know the date but it was after they built the railroad from New River to Pocahontas.

The witness on Cross-Examination testified as follows:

I was born in 1855. My father was not exactly a soldier. They would work him at different things on the boats and he kept out of war that way. He dug coal part of the time for the government. He wasn't on the boats regularly. Them boats would take five men to operate them and when one was off he worked extra. The boats were operated both by white people and negroes. They would have a mixed crew. Different
331 men were in charge of them. All of these men are dead I think. There were two of the Keisters—Kit, Dave Keister and Harvey Keister.

Q. Did the people who operated the boats wear uniforms?

A. Yes, sir.

Q. And they had a captain? What was his uniform; do you know?

A. No, sir; they never had no uniforms.

Q. They did not?

A. No, sir.

Q. When was it that your father brought this molasses up that he said he brought from Hinton?

A. That was after the Civil War.

Q. How long after the Civil War?

A. Well, about a year and maybe not so long.
Q. What did your father do after the war?
A. He farmed then, first one thing and another.
Q. Did he run on these boats regularly?
A. No, sir; he never did. He was just extra on them.
Q. Do you remember the other people on the boat that he ran on?
A. Yes.
Q. Who were they?
A. The Keister boys and Peter Price.
Q. Who else?
A. That is about all.
Q. Were the Keister boys on a farm near you?
A. No, sir.
Q. Where did they live?
A. They lived below Radford.
Q. They lived on a farm, didn't they?
A. They lived at that time on the Flanagan farm, it is now.
Q. And they were working on the farm. That was their job?
A. They were working on the boats.
Q. They were running on the boats?
A. Yes.
332 Q. And who was this other man that you mentioned?
A. Peter Price. He lived at Tom's Creek.
Q. Did he run regularly on the boat?
A. Yes, sir.
Q. How many of those boats were there?
A. Well, I don't know how many there were. I would see three and four in the gang together. I don't know how many there were in back of that.
Q. And you saw those boats at Pembroke?
A. No, sir.
Q. Where?
A. I seen them passing along where we lived.
Q. Belspring?
A. Yes, sir.
Q. Did you ever see any lower down the river than that?
A. I have seen them down at Eggleston.
Q. Did you ever see any up higher on the river than Belspring? Did you ever see any above Belspring on the river?
A. Yes, sir.
Q. Where?
A. I seen them up there at what we used to call Cloyd's Boat Landing.
Q. And where was Cloyd's Boat Landing?
A. Right down from Price's Forks.

Q. And you say boats were run all four years of the Civil War?

A. Yes, sir.

Q. Do you remember when some work was done on the river in your neighborhood?

A. Yes, sir.

Q. Where was that work done?

A. Well, there was some of it done along about Belspring and on further as far down as Davidson. I don't know about lower down.

Q. Was that work done by the State of Virginia?

333 A. It was done by the Government.

Q. What Government do you mean?

A. Well, I think the United States Government.

Q. Wasn't it done in the year 1860 or '61?

A. It might have been. I don't know what Government work was done.

Q. Did you see any soldiers working on it?

A. No, sir.

Q. Did your father work on it?

A. No, sir.

Q. You saw the work going on along there in 1860 or '61?

A. I don't know the date. I seen them working there.

Q. Can you get at the date at all, Mr. Snyder?

A. I don't think I could.

Q. When were you married?

A. It was done the year that the railroad started from New River Bridge. They were cutting the channel then.

Q. You saw somebody cutting a channel the year that the railroad started from New River bridge?

A. Yes, sir.

Q. That was the year 1880, wasn't it?

A. Maybe it was.

Q. You are sure you didn't see somebody cutting a channel up above New River bridge?

A. No, sir; I never was up there.

Q. And you saw the Government making a channel along at Bell Springs in 1880?

A. That is what they told me.

Q. What were they doing there?

A. They were cleaning out the channel, you know, blasting the rock.

Q. And you actually saw that?

A. Yes, sir.

Q. Do you remember who any of the men were?

A. Yes; one of them was Hurst. He lived up about Dublin—Bill Hurst and Ab Hurst.

334 Q. Are they living?

A. I don't know whether they are or not.

Q. Did you ever see any boats at Narrows, Virginia?

A. No, sir.

Q. When was it your father brought that molasses back—how many years after the Civil War?

By Mr. WILLIAMS. That has been answered once—a year after.

By Mr. ABBOTT:

Q. Did you state he brought that back the year following the Civil War?

A. He brought it back to the merchants at Price's Forks. They traded produce, went down there and traded for it and brought it back.

Q. I understand that; but I want to know the year it was. Was it the year following the Civil War?

A. The year after the Civil War.

Q. It was the year after the Civil War?

A. Yes.

Q. And he brought it from Hinton?

A. Yes.

Q. He told you that?

A. Yes.

Q. You don't happen to know that there was no such thing as Hinton until 1871, do you?

A. No, sir.

The witness on Recross-Examination testified as follows:

I am 81 past. I was born May 29, 1855. My mother told me I was born in 1855. I don't know anything about my giving any statements to Mr. Ould on November 20, 1931, saying that I was 73 years old at that time. (Paper is shown to witness.) I don't think this is my signature. I wouldn't say it ain't, but I don't believe it is. Still, I might have wrote it. (Paper marked Def. Ex. A for identification only.) If I am 81 now, I was 76

335 five years ago in 1931. I recall the facts of the Civil War.

(It was subsequently stated in the record by counsel for defendant that the signature was not that of the witness but of one A. W. Snidow.)

L. T. MEREDITH on Direct Examination testified as follows:

I lived in Buchanan in Botetourt and have been there for a year. I was born in Pulaski County, I suppose in the southeastern part, near New River at my grandfather's. He lived about 200 yards of the river. I have lived on the river all my

life until I came down here last April a year ago. I am past 79 years old.

I have seen boats on New River from the time I was a small boy about 10 or 12 years old until just a few years ago. I saw them along, I would say, from Towe's Ferry on down the river. I suppose six or eight miles; I don't know.

I had a boat built after I began doing business for myself and operated it. I carried lumber principally, down the river from six or seven miles above Radford, to Radford. I took some of the lumber to New River, some of it to Radford, and some of it to Miles, which is about three miles west of Radford where Little River comes into New River. I don't think the railroad was in operation up to Miles when I commenced hauling and that made it nearer for me after it got in operation. I carried lumber down to Radford before the railroad was built to Miles on Little River. Then afterwards what lumber I wanted to ship I would take to Miles after the railroad was built. At Miles I loaded it on the train. A great deal of the lumber went to the Norfolk & Western Railroad Company. I also sold to the Harrison Tie & Lumber Company. I sold lumber at other places also. I sold several carloads of export lumber to W. O. Price, of Baltimore. Part of the lumber which was delivered to Price was put on trains at Radford and part of it at Miles.

I saw work done on the channel up the river by the Federal Government. I haven't any record of the date, but I was a young man. The work was cleaning out what they called at that time the Government channel through the falls part of the river, the ledgy part.

My boat was 65 feet long. I am not sure whether the boats before mine were longer. Old Thomas Godby was one of my principal boatmen. Sometimes one could go and sometimes the other. They were both experienced men. Sometimes I
336 ran the boat myself; not often. We got down the river all right every time I ran it but one. That time I made a *mis-pull* in going through Ingle's Falls and wrecked my boat. That was the only time. I would carry from three to four thousand feet generally.

I think I have seen other products or produce going down in these boats on the river. I think I have seen people hauling corn and various farm products. I have seen a little cargo coming up the river in boats but not as much as I have going down. I really don't know much about where these products were being carried to because I did not haul them much on my boat. I don't think I ever carried any laths or shingles. I could not say positive I saw any of these boats carrying laths or shingles.

I have seen one gasoline boat on the same water on the river. It looked like a pretty good size boat. It seemed to be larger than my boat and it was covered. I saw windows in it. That was just after I sold my boat. I don't remember whether Mr. McWane bought a boat or had one made. I think the boat I saw was his.

I have seen pig iron shipped down the river. I have hauled tanbark to Radford on my boat. I have also carried ties.

When we got hung up on the bar at Ingle's Ferry, the ferryman there saw that we was wrecked and he come to us and put us on the land. I believe Mr. Duncan was one of the men, and Mr. Graham was another who went and unloaded their cordwood and came and took our load on their boat and took it down on this other boat which was hauling cordwood on the river at the time. We just took the water out of our boat and went on in the boat.

I couldn't say how many boats I saw on the river going up and down prior to the clearing of the channel. I live back about two miles and a half from the river but often was in sight of the river. Sometimes the boats passed without stopping at my grandfather's spring and sometimes they would stop. I couldn't estimate the number of boats, but there were several of them.

I remember a veneering plant down at Radford. I sold them veneer logs and I have sawed up their cull logs which they had on the yard. I have took my mill and gone down there and sawed up a good many thousand feet of lumber for them. That was their lumber which I sawed. They made veneer out of the veneering logs. I did not ship these down the river. They were not mine. I moved my mill down to their place.

337 The witness on Cross-Examination testified as follows:

I shipped my lumber from different points, that is, from wherever I would have my mill. I had my mill at Mr. Smith's place principally. That was about two or three miles below what was known as Towe's Ferry at that time. I also had my mill down lower on Mr. Earhart's place. That is near and a little above where the rock quarry is, just a little above the mouth of Little River. I didn't have my mill up at Linkous Ferry, but I boated lumber from it, export lumber that I would buy and sell. The places which I have mentioned may have been the only ones where I had my mill.

I understood that the gasoline boat I mentioned was Mr. Robert McWane's boat. I don't remember the name of the boat, but I believe that it was the Altha.

E. C. MEREDITH upon Direct Examination testified as follows:

I am the son of Mr. Meredith who has just testified. I live in Pulaski County. I was born in Pulaski County in 1879, a couple of miles or something like that from New River. I reckon the nearest point was at the S. A. Smith place, close to Abe Howe's place. That is just down stream from Towe's Ferry a short distance. I have lived near the river all my life.

I recall a man by the name of S. A. Smith. My father and I bought a boundary of timber from him, containing to the best of my recollection 105 acres. It wasn't quite all in timber. We sawed the timber there on the place and boated the majority of it down the river to Radford. It was sold there at different points and a lot of it was loaded from the river on cars and shipped to different places. I think W. O. Price got a bunch of that. It seems to me that he lived in Baltimore. I am not sure about that.

I couldn't tell you exactly how much timber we cut there. I imagine 250,000 feet. Most all of it went down the river. It was oak, pine, poplar, and chestnut—all kinds.

I have shipped tanbark down the river. We sold that tanbark to A. B. Hunter at Pulaski. It was loaded on cars there at Radford; floated it down the river, and then hauled from the landing to the cars. We used keel-bottom boats. I think the boat was 55 or 60 feet long. A boat of that kind would carry 4,000 feet of dry lumber.

Q. And how much of green lumber?

A. We generally hauled anywhere from 2,000 to 3,000
338 and sometimes we would have on as much as 3,500. If the tide was up, of course, we would——

Q. Did you ever have anything to do with the shipping, loading, and unloading of the lumber?

A. On the boats?

Q. Yes.

A. Oh, yes, sir.

I did the sawing, but I always helped to load the lumber, and then my father went off with it on the boat. It would go down the river on the boat. We loaded some also at the junction of the Little River, which was shipped down the river to the Norfolk & Western. The shipping down to Radford on the boats went pretty well at that time.

I also cut and shipped lumber for a man named Zack Cecil. We cut a boundary of timber on his place on shares. It was sawed and stacked on the yard and then we rafted a lot of our timber down the river to Little River and loaded it on the cars.

Of the timber that we cut for Cecil on shares we only rafted the heavy lumber. The light lumber we hauled on wagons to Dublin and sold it at Dublin. The amount of heavy timber we took down the river I imagine was something like 30,000 feet, I think that was all.

I have seen a steamboat on the river. To the best of my recollection it belonged to the pipe shop. The McWanes that had the pipe shop got that started. I knew of it running up the river as far as Towe's Ferry. I never did ride on it myself. I recall the S. A. Smith place. Most of the lumber we shipped came from that place.

The witness on Cross Examination testified as follows:

Mr. McWane's boat was just a motorboat, I suppose—not a steamboat, that is, it was a gasoline boat. It was about three feet deep. Sometimes very little of the gunwale would be out of water—six or eight inches or something like that.

I spoke of hauling lumber to Dublin. That was lighter lumber which we hauled on wagons from the Cecil place to Dublin. The Cecil place is up the river. I imagine it is about two miles below Towe's Ferry. The S. A. Smith place was down the river I imagine three and one-half or four miles below that. The type of lumber we hauled to Dublin was weatherboarding, framing, and light lumber, such as that. At that time the reason we did the hauling to Dublin was that we had sold our keel-bottom boat and that was the nearest point to haul to. It was
339 several years after we had sawed this lumber at the S. A. Smith place. We had sold our keel-bottom boat. I can't say positively who we sold it to. As to when we sold, I remember we did most of this hauling in 1903.

To the best of my recollection we finished up the S. A. Smith timber in the latter part of 1903 or the first part of 1904. Then we moved our mill out away from the river and a little later the boat was sold. I did the sawing on the Earhart place the year before. That was 1902.

The point from which we shipped the lumber on the S. A. Smith place was five or six miles to the best of my knowledge above Ingle's Ferry or Ingle's Falls. I think that is about four miles above Miles, the mouth of Little River, maybe not quite so far.

Referring to my statement that I boated the majority of the Smith lumber to Radford, I will say regarding the lumber which we didn't boat to Radford that there was some little amount which was sawed and delivered out away from the river that didn't go down the river, but all that was to be took to the railroad or to be sold in Radford we took down the river.

I don't remember when the railroad was built to Miles. It wasn't built then, I am confident. I think if I am not mistaken it was built just a little later. It was built there when I loaded this lumber from the Cecil place. I am not sure. I said a part of the lumber went to Dublin from the Cecil place and part of it was rafted down the river and loaded at Little River, at Miles. It was not boated but was taken down on a raft.

The witness on Redirect Examination testified as follows:

When we boated this lumber down the river it passed what is now the site of the Appalachian Electric Power Company dam.

ELY DUNCAN on Direct Examination testified as follows:

I was born in Floyd County, Virginia. I don't know whether New River passes through that county or not but where I live it passes in Virginia. I have lived in "Wassa" in Virginia on New River since I was 4 years old. I am 53 now. I do most any kind of work on the river, in the river, or on dry land, or anywhere most I can pick up a job.

340 I have seen boats on New River. I first seen "kettle" bottom boats, that is, keel-bottom boats, I suppose when I was small, maybe when I was 5 years old. They were boats to carry lumber or pig iron—working boats. They were called kettle-bottom boats. I wouldn't say I have seen pig iron in these boats, I guess I did. They told me that was what they were hauling. They always went down the fur side of my house when I was small and when they come back empty they a heap of times come up our side of the river. The channel was on the other side of the river. I heard it said by the older folks that was their business—they were hauling pig iron.

(Defendant objected to the statement of the witness as being hearsay evidence.)

I would try to get them to come nearer the bank when they come by empty, that was when they come up our side, and I was a small boy, not giving any attention, not thinking it would come up, or I would have to mention it at this age.

I have rafted logs or crossed ties down the river off and on through my life. I rafted some when I was, I reckon, a close guess would be 18 or 20 years old, and also some before and since then. We have started from the Howe place, say near the upper end of Dunkert's Bottom. Goldsmith and Dodd had a "neering" plant in Radford near the upper end on the Howe farm.

Q. How would you get these rafts down the river?

A. Well, with two links of a chain and staple to link them together with from one log to another, till we would get six side by side, or seven, or whatever we wanted in a span, then we would couple them like a car someway, fasten the span together

until we would get as many in length as we wanted. At times we would run them as rafts and at times put them in and float them like sheep.

Q. When they ran them in rafts did you ever ride on the rafts?

A. Yes, sir.

Q. Ever have any difficulty?

A. Nothing much, sometimes a little trouble, not much, maybe have a drift in letting them go from the channel, or something like that, and have to ply them off a rock, and might have some little trouble like that.

Q. Did you ever see a boat go up the river with a cabin on it?

A. Yes, sir.

Q. What was it doing?

341 A. Buying butter, chickens, eggs, and things and hauling produce.

That was a long while ago, back when I was something like 17 or 18 years old—not much over 17, I guess.

I recall a ferryboat about 50 feet long and 12 wide at Lowman's Ferry. At that time I was working for the company with Harry Smith, who was foreman for the Appalachian Electric Power Company, and guided the boat through from Lowman's Ferry or Cecil's Ferry. I did this in the early part of this last winter. Lowman's Ferry is near Hog Branch on the Mack's Creek section. I brought the boat about 10 miles down the river to Cecil's Ferry. It is somewhere at the upper end of Egypt Bottom, right at the upper end of Dunkert's Bottom. There was an old boat the company was using for to ferry their corn, wheat, hay, and stuff they raised on this side of the river to the fur side. It was used for a company boat to ferry the stuff raised on the company land. They generally stored their corn over there; that goes to the big stores—corn, wheat, and hay.

I recall a ferryboat at Towe's Ferry in 1918. That ferryboat got away there and went down New River below Pembroke and lodged on an island not over a half mile from Walker Creek. Pembroke is down the river with respect to Radford. It is down below Eggleston. Walker Creek comes in on the left-hand side going down the river. The island the boat stopped on is a short distance above the mouth of Walker Creek. We found the boat on the island and put it back in the river, run it back to Towe's Ferry; me and Mr. Graham together was helping the boat through the falls and channels, and sometimes we would have six men and sometimes seven, and maybe more. I don't know if the size of that boat was 12 x 50 or 12 x 60; I don't know exactly.

I recall a ferryboat at Ingle's Ferry or Ingle's Falls. One left Linkous' Ferry and went to above Ingle's Ferry and Ingle's Falls and turned over on an island. I went there and helped turn it over and run it back to Linkous' Ferry. From a rough guess I would think it would be 40 or 45 miles from this place, called Pembroke, up to where we brought it.

I have had experience rafting cross ties on the river. One time I helped Mr. Graham run some ties from, say, near "Wassa."

He ran in two spans and we run 210 ties into Radford.

342 We started from 8 or 9 miles up the river. When we rafted down we passed the site of the Appalachian Electric Power Company dam.

The lumber boat I ran on the river I think was a seven-ton boat. I don't know exactly the thousand feet I could carry on a boat of that kind, but we generally hauled about seven tons. The wagons brought it to the river where we was loading.

I headed one boat for Mr. Merritt. I didn't own the boat. I was hauling lumber from a saw mill. It left near the Howe boat landing and went to Radford. Some boats went to Little River and some went to Radford. We had some of it at the mouth of Little River; sometimes we would bring paint and supplies back they needed. That was going upstream. I have carried tanbark.

I have been on the river in the wintertime. New River has been frozen, to my knowledge. It is frozen over at times according to how hard the winters are. Sometimes, maybe nearly a month and sometimes it is not many days. At times it will freeze and in less than a week it will thaw and break. Sometimes it might be three weeks. Sometimes it would freeze twice in a winter. Sometimes not over once.

The witness on Cross Examination testified as follows:

I am 53 years old. You can figure out what year I was born.

I don't know when it was I saw this pig iron boated down the river. At a rough guess I might have been something like 5 years old. I was anxious to see the boats. My daddy owned a place adjoining the river and I would be on the banks and watch them. I heard it said they were hauling pig iron but I seen them pass and couldn't say for sure, but wouldn't say because I wasn't large enough, from my recollection, to tell about what they were hauling, only I heard said. I could have been 6. I was old enough to remember seeing the boats.

We put some of the logs which we floated down in the river on the upper end of the Have Howe farm—what you would call the upper end of Dunkert's Bottom—2 miles if you would take it around the river—and we put in some below in different places.

I remember a place in the river along that pool along Dunkert's Bottom called Moore's Gravel. I have floated logs through that pretty well. I have put logs in above there. If you hit the channel right you would go through pretty good. Part of the
343 channel is completely filled up and part is a little bad. I imagine at this time there would be some places at which you would have to roll the logs over there unless you had a tide.

I don't doubt but what we had 6 feet or more of tide when Harry Smith and I took the ferry boat down the river.

I remember when Henry Elkins, Sam Sissle, Dave Thorton, George Smith, George Hall, and I brought the ferry boat back from Pembroke. I don't mean we just got on it and went scooting up the river. I didn't say how long it took for us to run that boat back but it was something close to 10 days. We did not use a block and tackle all the way, but we had one with us which we used at times. We had a very good tide and some showers. Part of the time we had a small tide. We didn't have any extra large tide.

The witness on Redirect Examination testified as follows:

I had no experience or knowledge of the channel where I brought this boat up from Walker's Creek except for part of the way. From Radford to Towe's Ferry I was very well acquainted with the channel. I had never been down the channel below East Radford before that so that coming up this channel was new to me. I had to feel my way along and find the best way to run the boat.

T. C. REDPATH on Direct Examination testified as follows:

I was born in 1877. I am 48 years old. Until I was about 18 years old I lived at Snowville on Little River. I would say that is about 6 miles from the mouth of New River.

The testimony which I am about to give relating to New River pertains to that section of the river between Radford and Towe's Ferry. I am familiar with the location of the dam site of the Appalachian Electric Power Company. I lived there tolerably close to it. The dam site I think is a quarter of a mile above the mouth of Little River.

Sometime after moving to New River, I think it was along about 1918, I cut a boundary of timber on the river, during a period of about 18 months. I would say that I cut around 200,000 feet of timber of all classes. After it was cut I boated it
344 to Little River and from that point I loaded it on cars. I guess it was about 4 miles from the point where it was cut to the shipping point on Little River.

I produced lumber and ties—car stock stuff, and I rafted some logs—2 rafts of it. I cut some cross ties and boated them.

I owned a boat which was 50 or 60 feet long as I remember and 8 feet across. Mr. Coffey built it for me and he said it had around 10-ton capacity. You could carry around 4,000 feet of green lumber on it and about 6,000 feet of dry lumber.

In getting the boat up and down New River I had a little trouble a few times. Occasionally, it would sort of hang up with me about 150 yards below where I loaded it. That was just below Moore's Gravel. Sometimes we would be dilatory in striking the boat sluice and would get off that and hang up. So long as I found the channel or sluice I had no trouble.

I navigated the river in all seasons of the year and all stages of the flow of the river except that if the river would get up high we would stay off. If it was too high it was dangerous.

I think I observed fluctuations in the tide of the river. I suppose it was the dams at Byllesby. There would be about 18 inches tide every 12 hours. I did some muskrat trapping. I put traps at the edge of the water and the next morning we would find the traps on the edge of the bank so we cut that out. I had no muskrats in the traps.

The witness on Cross-Examination testified as follows:

I trapped some muskrats sometimes. Occasionally I would catch one. My home on New River is about 8 or 9 miles above Radford, right across the river from the Have Howe place. I bought the last tract of Mrs. Harry Howe Ferrow.

I sawed this boundary of timber at my sawmill about 4 miles above the dam site. This was right on the left side of the river—on the south side of the river from Moore's Gravel. We loaded the boat just below Moore's Gravel. My mill site was above Moore's Gravel. I would guess the lumber to have been 200,000 feet. It was boated from below Moore's Gravel to the mouth of Little River, which is all in the same pool of water. There is only one little rough place, places where I would get hung up and miss the sluices. The depth of
345 my boat was about 3 feet I would guess. Sometimes the boat would be loaded mighty heavy—to 3 inches to the top of the gunwale. We aimed to haul right around 4,000 feet and to have the boat in the water 3 or 4 inches. The gunwale had an offset in it. I don't know whether or not it was 3 or 4 inches—the top of the gunwale—we loaded to that. Mr. Coffey, an old boatmaker, who made the boat, said it would carry around 10 tons. I could not say that I ever got 10 tons on it. I don't know what lumber would weigh to the feet. I used to know but I have forgotten.

I operated the boat for 18 months. After that I sold it to Mr. Fagg. He boated 3 or 4 small sets with it. Then it rotted

down. That boating which I did was on the same body of water which I mentioned.

The witness, on Redirect Examination, testified as follows:

By the COURT:

Q. Was there any timber left up New River—is there any timber up there now?

A. It is mighty scarce through our country.

It has been since 1925. I believe the Appalachian Electric Power Company had a nice boundary in what they call Egypt but I think they cut all that.

Q. Did you ever propel this keel bottom boat of yours by motor?

A. I used to have a Ford engine on it towards the last.

Q. Did it operate successfully?

A. It just done fine. We handled it all right with it. We could make about 10 miles an hour.

Q. When the boat was run by power, how many men did it take to operate the boat?

A. Just one.

Q. Otherwise, how many men would you use on the boat?

346 A. Three.

By the COURT:

What kind of motor did you say it was?

A. It was just a Ford engine. The axle was set right across the back end and had paddles on the wheel.

The witness on Recross-Examination testified as follows:

The Ford engine didn't go out. If it hit that sluice where it was cut out I could make it all right. I always had some pushers on there. We kept them to unload. If we needed them and hung up on the rocks approximately 100 yards below where we loaded, I used the men to push it off and inch it around. It would bring the loaded boat down and bring the empty boat back, without shoving, except when I would hang up.

H. L. FAGG on Direct Examination testified as follows:

I am 45 years old. I was born above Snowville on Little River and spent about the first 14 years of my life there. That would be about 1915—Yes, sir; 1905 is right. I lived there with my father.

Q. From the year 1905 up until the year 1925, state whether or not you and your father were engaged in the timber operation on New River?

A. Yes, sir; off and on we were engaged in it the time we was there.

Q. You will have to speak louder.

A. My father first operated a boat, and after he quit and moved away from there I operated it.

By Mr. ABBOTT. We object to that. His answer is entirely unresponsive. He was asked if he and his father had engaged in timber operations from 1905 to 1925. He has said something here about the operation of a boat. It also seems that the question is too general. The specific operations should be brought out and we move that the answer be stricken out of the record. I think it had better be brought out in response to boating questions.

By Mr. AIKEN. I asked the general question to conserve the time of the Court.

By the COURT. You asked about timber operations and he started to talking about boats. You better take it in proper order.

By Mr. AIKEN:

Q. Was the boat that you speak of used in connection with your timber operations?

A. Yes, sir; we used a boat to haul it to the railroad.

Q. During this period from 1905 to 1925, in which you and your father engaged in lumber operations or timber operations, can you state approximately how much timber of all classes was moved down New River by you and your father by boat?

A. Not exactly; but I guess something like 1,000,000 feet.

Q. Something like 1,000,000 feet?

347 A. Yes, sir.

Q. Can you describe the timber—the various classes?

A. It was railroad stuff; we sold it to the lumber people in Radford; it was railroad lumber.

Q. Cross ties?

A. Cross ties and switch ties and bridge ties and inch boards. I did not do any rafting. The boat which I spoke of was 60 or 61 feet long and about 8 feet wide. As best I remember, the capacity of this boat—we hauled about 3,000 feet of green lumber and up to 5,000 feet of dry lumber on it. We boated principally from what is called Have Howe's place or Moore's Gravel to the mouth of Little River.

I know where the dam site of the Appalachian Electric Power Company is on New River. It is in the same vicinity in which we navigated by boat. We went right through that place. In operating this boat up and down there to the mouth of Little River we hardly ever had difficulty in making the passage at any time except when the water was low and we would be at Moore's Gravel. We had trouble there once or twice—a few times when the water was low.

Q. State whether or not you were able to transport this lumber at all seasons of the year or had to wait for the tide?

A. No; we transported any time we got ready, except that we would not do anything in the wintertime. This was principally in the summer; hardly ever any in the winter.

Q. As a matter of fact, isn't the summertime the period of the low flow of the stream?

A. Yes, sir.

By Mr. ABBOTT. I dislike very much to object, but that is very leading. He constantly leads the witness and evidently pays no attention to the objection.

By Mr. AIKEN:

Q. Why didn't you navigate the river in the wintertime?

A. For one thing, it was too cold to be on the river.

Q. But unless the river was actually frozen, you could have navigated it, couldn't you?

A. Yes, sir; sure.

By the COURT. Mr. Aiken, you had better let the witness testify.

By Mr. AIKEN. I was simply trying to expedite matters.

By the COURT. We don't want to be too expeditious or so expeditious as to cause us to make a parrot of the witness.

348 The witness on Cross-Examination testified as follows:

I cannot remember, but I imagine the draught of my boat was from two and one-half to three feet. When I had 3,000 feet of green lumber or 5,000 feet of dry lumber on it the boat was down to 2 or 3 inches from the top of the gunwale.

To the best of my knowledge, it is about three and one-half miles from Have Howe's place to the mouth of Little River.

I have been engaged in cutting timber and doing this boating off and on nearly 20 years. We might be off a year or two and then we would buy another job or two on the river and cut it. It was not regular at all. Outside of the lumber business I was farming.

J. D. HALEY on Direct Examination testified as follows:

I am 74 years old. I will be 75 next September. I have lived on New River nearly all my life. I was raised on what is called Dunkert's Bottoms on the Hiawassa side of the river in the Hiawassa District.

I knew a Captain Welch in my boyhood. We boated a great deal on New River. I say that Captain Welch did. He had 5 boats built and he boated from Mack's Creek. I don't remember how long he did this work, but I know he had the boats built for that purpose. Yes; he boated pig iron from Mack's

Creek down to New River bridge. I am not sure but I think the boats were 60 feet long and 11 or 12 feet across the top.

Q. Can you tell us approximately how long Captain Welch was engaged in transporting pig iron from Mack's Creek furnace to Radford?

A. No, sir; I am not positive how long he ran. After he got his house burned up, he moved away, and I don't know just what his business was after that, but it strikes me like—I will not be positive that he come down the river and was doing some boating down below, but I ain't positive. I was small; that was right along about 1870 or 1872, along there; I cannot tell you exactly, because I was just small when we moved there, and we lived right close to Mr. Welch—right where Dan Howell lives now.

Q. Do you know of anybody else owning any boat on the river at that time?

349 A. Not right at that time. I have known of some since.

Q. Well, later on. What was the next boat that you were familiar with?

A. Meredith did a lot of boating.

Q. What Meredith?

A. Tillow and his son and Fagg done a lot of boating there and Redpath and Ingles had a lot of it done, and Fagg and Meredith were the last ones in that timber business there, and also old Captain Andy Moore. He built one especially for his own benefit.

Q. What business was he in?

A. He was engaged in farming and he built this boat to transport stuff that he made on the farm.

Q. What did he make on the farm?

A. Corn and wheat and hogs, principally.

Q. Do you know where he transported the corn and the wheat and the hogs?

A. I think principally down to New River.

Q. You mean New River Depot?

A. I think so, principally; yes, sir.

Q. These other parties of whom you have spoken—Meredith and Fagg and Redpath, what were they transporting in the boats?

A. They transported lumber.

Q. Can you describe the various kinds of lumber you have known to be transported on New River by these parties?

A. I think the railroad bought most of that lumber. Most of the lumber was boated from Little River and loaded on the cars—that is the best grade of lumber. Of course, weatherboarding

and stuff like that was sold in Radford, principally, I think. There was a company there that handled that stuff, and I think they handled the most of it.

I saw a couple of steamboats or powerboats that they tried on the river, but they were not much in the way of steamboats.

Old man Hodges tried to make one when he owned his
350 plant on the river. He made buggy spokes and rims principally I think. The buggy spokes and material of that kind came to his factory which was at New River depot. I don't know where he sold it.

The witness on Cross-Examination testified as follows:

I saw Mr. McWayne try to run one steamboat on the river there but he didn't have it succeed very long. He made a few trips. I made one trip with him to the ferry. We had to have a little water to make the trip and we had plenty that day. I don't know how much the tide was. It was up to the top of the bank. I don't know the name of his boat. They called it "McWayne's Excursion." I thought he would buy stuff up that way and haul passengers. He didn't run very long for some reason. I suppose he didn't have water enough. The McWayne boat had superstructure on it.

The Hodges steamboat was nothing with a keel-bottom boat with a little engine on it. I never was on it that I know of. You could run all right with it, but you had to have men to push it over the falls. It was run by steam and had a little stationary engine with an upright boiler, I think. I don't know whether I heard the whistle blow or not. I never was on the Hodges boat. He used to come to our landing at the Moore place and load his boat with hickory and take it to his place of business.

My home is at the Harvey place now, a little over a mile from New River. I have not lived in sight of the river for 20 years except now and then. It has been over 20 years since I moved away from the river.

Fagg and Meredith sold the weather boarding wherever they could. I think the railroad company got the principal part of it. They boated weatherboarding to Radford. They sawed anything that they had that would sell. I don't know what happened to the Fagg boat or who got Captain Andy Moore's boat after he died. He used it as long as he ran the place there. The heirs took charge of the place after the old lady's death and after that I moved away. Captain Moore used his boat for hauling stuff to Radford.

THOMAS MONAHAN, on Direct Examination, testified as follows:

I am 68 years old. I was born in Wythe County, a couple
351 of miles from New River. I have lived on or near New River 46 years and live on the river now. I have been

working at the Carbide plant until a few days ago. This belongs to the Union Carbide Company. I am familiar with the mine up there called the Sisk Mine. It was located right along the river, on the far side, east of where I live, about a quarter of a mile. The place where I live is about 2 miles from the postoffice. It is south from Ivanhoe and further up New River. I don't know exactly how far it is from Allisonia but I suppose it is about 8 miles from there. I have lived above Ivanhoe for 46 years. I saw what was going on around the Sisk Mine, mining and hauling ore and stone.

I have seen boats hauling limestone and ore on New River above and around Ivanhoe, where I live. The boats would receive the limestone and ore about a mile or a mile and a quarter south of Ivanhoe up New River, and would haul it down the river to Ivanhoe about a mile and a half or two miles, and they hauled it about a mile and a quarter, I suppose. They got this limestone off the cliff along the bank of the river. It was a natural product there. They took it to the Ivanhoe Furnace or the New River Mineral Company furnace. I saw these boats carry limestone about 40 years ago. They carried the limestone for a period of a year or 18 months, to the best of my recollection.

I have seen some logs rafted down the river past my place.

I know there was work done on the channel in New River. About 46 years ago I worked on a channel there for the Government from the first of June up until the first of November or until it got too cold for us to work. Captain Robert Smith was the superintendent of the work. We were cleaning out a channel about 3½ feet deep under the water and about 20 feet wide. They claimed they wanted it that wide. We used a boat ourselves in hauling rock and making the wall lengthy. We would blast the rock out and put it on the boat and hauled it down to make the wall longer and to hold the water in. They wanted the water to stay in the channel. We would blast rock from the channel and put it on the boat. We took up the loose rock and laid it on the boat and hauled it down the river and made a longer wall. The boat went in the channel which we cut there.

352 The boats would carry this rock I would say a couple of hundred yards. We would clean out one riffle and then go to another. We worked on the channel until we got to a ledge of rock or until the water got deep again and then we moved to another place. All the places I worked at covered a period of about 3 miles. We worked from where we began at the lower end until we stopped in the fall or until it got too cold for us. We worked in the water and were wet all over in the water. The size of the boats we used to haul this limestone was about 40 feet long and 10 feet wide the best I can tell. The boat was made

right there close to where they put it in the river on a little bottom there. They had one large boat. There were about 3 gangs working and each gang of men had a boat. There were 12 or 15 men in each gang.

I still reside on this farm above Ivanhoe. I know where the Buck and Billsby Dams are located. The first one is south about two miles from my farm and the second one is between four and five miles above my house. Both are upstream right south from where I live.

Q. State whether or not you have observed the channel in the New River since the Buck and Byllesby dams were put in, and what you have observed as to the water in the channel?

A. You say to state what?

Q. Read the question. [Question read.]

A. At times there is water in it, and at times it went down so there wasn't any, when it was shut off it gets mighty low, sometimes the water is very low.

Q. When it is low, or I will ask you, is it low generally or at certain times?

A. At certain times.

Q. When is that?

A. Sometimes the river is about like usual or like it was before the dams were built, and then when the water is turned off or cut off, it will be dry and you can wade out in it, and there is just a little stream in the channel, and the deepest part is along about where I live.

353 Q. Is there any particular time of the day or the week when you notice the channel low or high?

A. About five or six o'clock in the morning the water is mighty low and then it will go to coming up and about 10 or 11 o'clock it will be the usual water.

Q. You mean you cannot use it in the early morning?

A. You have to go way out in it to get a bucket of water.

Q. What do you use the water for?

A. We get water there for my stock and sometimes they use the river water for washing purposes and we have to make a hole and lay a plank there to dip the buckets in at times, and then the water will come back up and we will take the plank away and it would come up back to normal just like it always was, in an hour or two.

The witness on Cross Examination testified as follows:

The New River Mineral Company had a large boat that hauled ore and limestone from the Sisk Mine about a mile and a quarter down the river I suppose it was. I didn't measure the distance. They used it for hauling limestone and ore and sometimes they took a load of rock. On this boat they had small cars which

held 3 or 4 tons or something like that and a little motor was placed on the end of the boat somewhere to push it up to the rock or up the stream. After they loaded the cars the boat ran mostly by itself down stream. Of course, they had a man sore of guiding it with a pole.

Q. Did they guide it in this channel that had been made?

A. They had to keep it in the deepest part of it.

Q. As a matter of fact, this boat was what you call a winding boat; you wound it up and down the river.

A. They had a motor on it. I wasn't on the boat, I went along on the road there and saw them, but I wasn't working on the boat.

Q. Did you see a fixed cable which the boat was in contact with and by which it would pull itself up and down the river?

354 A. I seen a cable there about the landing place, but I don't know what they were using it for. I saw the old cable after they quit. They might have had a cable on it but they had a motor that was making a terrible racket.

Q. That was the winding up and down the river?

A. I don't know about that.

Q. Was the boat fastened to a cable?

A. I don't know how it was fastened. I just seen them go up and down the river with the boat, and I seen that motor pushing it. I was hauling or driving a team along the road and they were in the river, and I just noticed it for a time.

The boat had a motor on the end of it so they told me and pushed it back up the river. I seen the water flying terrible. They told me it was the motor that did that. They had a cable which pulled the cars up and they had a hoist that pulled them on top of the furnace where there was a track laid. They unloaded the cars up there and let them drop back on the boat again. They would load the cars at the mines and run them on to this boat and then haul them down to the furnace and unload them with the cable. I don't remember seeing a cable except pulling those cars out there. I saw an old cable laying there time and again as I passed and it looked like they had been using it for something. The New River Mineral Company owned that boat. I never was on it. I just passed by on the public road. I was hauling sand and I seen them at work there every time from the public road which went right along on the banks of the river at that time. That was the only boat hauling rock and the only one working on that channel I ever saw.

We blasted the rock and took it out of the channel and put it on the boat and made a wall to hold the water in the channel on down the stream. We lengthened the walls on both sides. We

put all of those rock to lengthen the wall and when we got to a riffle we would blast that layer of rock out. Then we would move up until we struck another and maybe we would
355 go a hundred yards before the water was too deep to work in it. Then we would strike another channel and would work through it the same way. I did a little of everything on that work. I turned the drill sometimes and worked on the channel and sometimes they put me in as foreman. The regular foreman, Dan Downes, would put me in as assistant foreman and I would have those rocks loaded and have the wall built. He got the foreman's wages and I had to do the work.

They wanted a channel twenty some feet wide, maybe thirty. 3½ feet was the depth under the water. They wanted it so it would be 3½ feet deep or average that.

Q. When you were acting foreman of that gang, your instructions were to cut that channel 3½ feet deep?

A. Yes, sir. If he had to go off anywhere to another place he would leave me there to do the work, and I tried to do it under his instructions, do what he said.

Q. What year was it that you worked on that channel?

A. That was 1829 or 1830. I had it down on a piece of paper in my home, or in the Bible and I forgot it. It had been 46 years ago the way I got it down.

Q. The only way you know about the years is by this paper that you left at home, isn't it?

A. I know what I got down on the Bible when I came there 46 years ago.

Q. You have got 1829 or 1830 on the paper, have you? How old were you when you worked on that channel?

A. I was right around 22 years old.

Q. How old are you now?

A. I will be 68 years old my coming birthday.

Q. So that it was 46 years ago on the first of June that you started that work?

A. Something like that, the best I can get at it, it was about 46 years ago.

I began working there about my house about a mile and a half or two miles right below Buck, right straight across from
356 my house. The name of the ferry at Ivanhoe is Porter's Ferry, the old Porter's Ferry. The Porters used to own it and there is a ford there below and we went to Porter's Ford where we started working. Porter's Ford was about a mile above Porter's Ferry and about a mile and a quarter from the Sisk Mine, I think. The ford might be a little over a mile above the ferry. It is above the Sisk Mine. A channel has been constructed up to that point before I went to work there. We built

the channel above the ford, and set in to work a right smart little piece above the ford and worked up the river as far as Byllesby. I didn't work on the channel below the ford but I have heard them tell of them working some up to that point, years before I came down there. We started to work in the first ledge of rock above Porter's Ferry. That year I guess we worked about three miles from there up to Byllesby. We were right even with Byllesby on this side of Byllesby Dam. Then we stopped work but they worked up the river, I don't know just how far, about three miles. I can see Buck Dam from my house. The channel we worked went right up through where that dam is. The dam was built several years after the channel was constructed, just how many years I don't know.

The New River Mineral Company was the name of the company that owned the Ivanhoe Furnace then. It is right below Porter's Ferry, a little piece, I think a few hundred yards down. It is a sort of a hollow where the furnace was. I think the furnace is about 300 yards west of the river.

When we were cleaning out these shallow places in the river in making this channel, we worked right down in the water and we were wet all over. We would have to stoop down to pick up the rock we had blasted. We drilled the holes and then put the dynamite in and then tied the fuse to the fork and shoot it. Then we would get in the water and pick the rock up. Sometimes the water would go plumb around my neck. Sometimes it would run down my neck and we might have to go under the water to lift the rock up and lay it on the boat. We started this work in the channel about the first of June. I came down there about the 15th of June and worked until about the first of November or until it got too cold for us. The water stayed up plenty well during that period. When it rained sometimes it would get up and we couldn't work but would have
357 to wait until it got down. We couldn't work much when it was muddy and didn't put in full time.

By Mr. WILLIAMS:

Q. Where did you do the work?

A. In the riffles.

Q. In the shallow places?

A. Yes, sir.

By Mr. ABBOT:

Q. In response to a question His Honor asked you a minute ago you said you would get in the water up to your neck. You mean you would do that when you stooped down in the water?

A. Yes, sir. The water would be that deep [indicating] and you would have to reach down to pick up the rock and lay them

on that boat and then when we got the boat loaded we would let it slide down the river and make the wall.

Q. And sometimes the rock was in the water about the length of your arm?

A. Yes, sir; and then we would have to get down pretty low to get the rock.

By Mr. WILLIAMS:

Q. If you were standing in a situation like that, where would the water come to?

A. About here [indicating].

Q. Around your waist?

A. Yes, sir; somewhere along there, and then the rock was a little high but we could feel the water all right and when the water was clear we could get the rock out, but when it was muddy we couldn't work and we would have to stop until it cleared up.

By Mr. ABBOT:

Q. You don't mean to say that the water was waist deep before you cleaned the channel out, do you?

A. No, sir.

By Mr. WILLIAMS:

Q. Were there any places in the river where you worked that the water was waist deep?

A. Not where we worked. After we got so deep then we couldn't work in it. There was layers of rock and we
358 would work through that and then strike deep water and sometimes we would go three or four hundred yards or half a mile before we would strike another channel and then we would work through that.

By Mr. ABBOT:

Q. Mr. Monahan, did you work on the channel where the Byllesby dam is now constructed?

A. How is that?

Q. Do you know the dam owned and operated by the Appalachian Electric Power Company called the Byllesby dam up above the Buck Dam?

A. We worked near to the Byllesby dam, in the channel this side the Byllesby dam a little piece, right close to it, and we worked to where the Buck Dam is.

Q. Was the channel cut through the place where the Byllesby dam is located?

A. We never got up that far.

Q. The year that you worked there you did not get that far?

A. No, sir; we didn't get up to that, but we got pretty close to it, but we didn't get right up to it.

Q. Did the Government continue the cutting of that channel the year after you worked?

A. I don't know what they done with it. They just worked us and cut us off and quit.

Q. Where did you go to work then?

A. I went to work around there for myself on the farm; I didn't work out much, I hauled sand.

Q. Do you recall whether or not the Government ever did any more work up there on the channel after you stopped?

A. I never seen anybody else working on that channel after we stopped.

By Mr. WILLIAMS:

Q. Did you do any work on the channel where the Buck Dam is?

A. To the first dam, we worked to that place, and there was right smart rock cut out there.

Q. Near the Buck Dam?

A. Yes, sir; there was right smart ledges of rock there. That is the first dam and we call it Buck Dam. We call that the first dam and Byllesby the second.

359 DAN HODGE on Direct Examination testified as follows:

I live at Ivanhoe on New River in Virginia and have lived there nearly all my life. I am 59 years old. I have been running the Ivanhoe Ferry for 35 years. The New River Mineral Company was located right at Ivanhoe, but they have sold out now. They manufactured iron. They had some mines, one was the Sisk Mine which was about a mile upstream from Ivanhoe.

They brought the ore from the Sisk Mine down the river about a mile on a flat-bottomed boat which was about 40 feet long and 12 feet wide. They got the ore on the boat by cars which ran on a little track. They ran the cars off the boat under a little chute in which they dumped the ore. Then they put the cars back on the boat and came down the river with them loaded. They took the ore opposite the Ivanhoe Furnace. They pulled the ore from the river up on top of an incline. They used limestone as a flux for the ore. They got a portion of the limestone at the Sisk Mine and boated it down to the mill also on the same kind of boat.

I have seen some timber to make a ferry boat floated down the river. There is a railroad bridge up there. I recall when it was constructed. They got some stones up the river for the piers and

some down the river. They boated some from one quarry up the river and some from one down the river. The quarries were not very far up the river from the bridge. I should judge they were 300 or 400 yards from it. I could not say exactly how far down below the quarry was, possibly two or three hundred yards. They did not use the same boats for getting the stones down to the bridge that they used for the ore. They used smaller boats—not keel-bottom boats but flat-bottom boats. They built a cofferdam there where they floated logs down the river to build a ferryboat. They floated some of the timber for the cofferdam and some (the log part) they got at an island below the bridge. Part of the other logs came from up the river about half a mile I guess. When they cut them they floated them down. Fowler's Ferry, I think, is four miles from the Sisk Mine. I recall there were timbers sent from Fowler's Ferry up there, that is
360 where these boat "gunnels" and timber come from to make the boat. They were floated about 5 miles from there to Ivanhoe and came down to Austinville about 3 miles more, altogether about 8 miles.

Q. How was this boat you speak of propelled, how was it moved?

A. They had an engine on it, upright boiler, and little engine and had two drums on it and real close together, and put a wire between these drums, and when the engine was running that made these drums run, and that pulled it up the river, and then as they slacked off they floated back downstream.

Q. Those drums acted as a coil and pulled it up?

A. They didn't wind up, it was stationary at each end, and when they run they held the rope tight, you know.

Q. Was there a wheel on the boat?

A. Yes, sir; a wheel on the outside, and a small wheel inside, with cogs on it.

Q. Was there any kind of a wheel that would throw water?

A. Yes, sir; at first it did, and it wouldn't work good, and they taken it off, they tried the cable.

Q. At first it was run by kind of a paddle wheel?

A. Yes, sir; just like a mill wheel.

I have not seen many boats on the river except those ferryboats and the boats I was telling you about. We do not have skiffs up there. We use a canoe. Last summer I saw a two-cylinder motorboat on the river, which M. M. Price, an Ivanhoe merchant and undertaker, was running. He runs that boat there in that eddy water and then to Byllesby Dam for pleasure. The length of the pool up there must be 3 or 4 miles.

The witness on Cross-Examination testified as follows:

I run Porter's Ferry. Fowler's Ferry is about 4 or 5 miles up the river from it. The lumber I said I saw brought down the river for a ferryboat was a pair of boat "gunnels" (gunwales). There were two attached together.

361 Q. I believe you also said that some of the timber for the framing around the bridge piers below Ivanhoe were floated on the river?

A. Yes, sir; floated some down, and hauled what they got down the river, hauled it up in a boat, and what they got above they floated it down.

Q. How far did they float it?

A. Not very far.

Q. A mile?

A. No; about three or four hundred yards, something like that.

Q. Now, this boat that worked on this cable or trolley, that trolley was laid along over the channel that was prepared in that eddy, wasn't it?

A. I could not say.

I know pretty much where that channel was, but I wouldn't say positively. They had to stay where the cable went and could not go all around in the river. The boat was propelled by a kind of wheel that went down in the water. They discontinued using it because it wasn't strong enough to pull the boat.

The motorboat was a little pleasure boat.

I should judge the ore boat was about 40 feet long. I think it was used a little over a year, maybe not quite that long. That is the only boat I ever saw hauling anything on the river, only what I seen them haul down at the bridge, which was being constructed in that neighborhood.

I have been at Porter's Ferry 35 years, practically all of the time. Sometimes I have been away a week or two. Porter's Ferry is right at Ivanhoe, just about even with the iron furnace. Before I ran the ferry, boylike I was running up and down the river. The iron furnace is straight up west from the ferry about 200 yards. I am tolerably familiar with Porter's Ford. It doesn't lack much of being about at the county line between Carrol and Wythe.

The witness on Redirect Examination testified as follows:

I noticed a change in the rise and fall of the stream at New River during the day. In one way early in the morning we ain't got no water hardly for anything, if it wasn't right be-

362 tween the falls I could not run my boat, and late of an evening it was the same way, unless it is up from rain. The flow becomes greater at different times, just when they put

the load on at Buck. I mean when they start up the works. This starts the water through the gates. It comes down through the turbines. You cannot run a boat of say a foot or two feet of draw up there when the water is cut off.

JAMES MICOU on Direct Examination testified as follows:

I live 6 miles southeast of Dublin on the old rock road, about a mile from New River. I was born there and have lived there all my life. I am a farmer now. Twenty years ago I was a civil engineer. I am 56 years old. With the exception of about ten years I have lived on New River all my life—46 years I would say. From 1905 to about 1915 I was away.

During my life on New River I have seen bateaux on it. I would say the main boat I saw was about 50 feet long and about 8 feet broad and had a long rudder behind, say 20 or 25 feet. All over its length would be about 70 or 75 feet. I saw these boats between Captain Andrew Moore's place, which is known as Dunkert's Bottom, and New River bridge. Captain Moore transported all of his small grain by boat. I think it was corn and some wheat which he carried to New River bridge. I have seen these boats come through Ingle's Ferry and Ingle's Shoals and stop there. Those boats did not carry lumber.

I have seen boats carrying lumber, not at that place, but where Mr. Redpath had a mill about two miles above the mouth of Little River. He sawed out a boundary of timber there and boated it to the mouth of Little River. He had a keel-bottom boat of his own and loaded the timber there on cars.

I can remember having seen bateaux on the river since I was ten years old, I think forty-odd years ago, forty-six or forty-five years ago. I am not very familiar with the river up around what they call Fall Branch.

I saw lumber brought down the river to the junction of New River with Little River. That lumber was loaded on cars of a little branch of the Norfolk and Western which runs out there and into Radford. This boundary of timber which Mr.
363 Redpath had was principally yellow poplar.

I recall when this branch of the Norfolk & Western Railroad was built up there to Little River. It was sometime prior to 1905. My father and I worked on it. I think this was between 1900 and 1905. I couldn't say positively.

I saw a little steamboat on the river once up in Dunkert's Bottom by Little River. That boat was owned by a stock company. It was small and looked like a large bateau just about cut half in two and propelled by paddle wheels behind, a square end you understand, with a stationary engine. That boat stayed

a good while at Ingle's Ferry—that is Ingle's Falls. I have seen it go through Ingle's Falls.

The witness on Cross-Examination testified as follows:

Those bateaux which I mentioned as being 75 feet overall, had a big oar behind which was about 20 or 25 feet long. The boat itself would be some 50 or 55 feet. Captain Andrew Moore's place is 3 or 3½ miles above Ingle's Ferry, I would say a mile and a half or two miles above the mouth of Little River. I have never measured it myself. It is in that pool above Ingle's Falls, what I call the upper eddy.

I testified about another bateau which Redpath boated his lumber with. I don't know what became of that bateau. I believe those are the only two bateaux I can recall.

The steamboat we were talking about I believe was called the "Queen of Sheba." I have seen that boat in the upper eddy more than once. I have ridden over the falls on it. They ran excursions up there. It would go over the falls all right if there was a little tide. If not, they would have to help it a little. They would not always have pushers. The boat would go over on about a foot tide. If the river was low they would have to pole it through, that is if they didn't have as much as a foot tide. Mr. Hodge built what was called the Hodge steamboat. It had a little upright boiler as I remember. It was the boat that the Ingles were interested in in the company.

The witness on Redirect-Examination testified as follows:

I have not heard of a boat called the McWane boat. I was not speaking of that boat. I spoke of remembering only two
364 bateaux on the river. That is all I have ever seen. The McWane boat might have been there the ten years I was away from that neighborhood on the railroad.

ZATTOO FARMER, on Direct Examination, testified as follows:

I reside on the borders of Pulaski just across Ingle's Ferry. The old rock road passes right by my house. Going up on the river it is on the far side. I have lived there about 30 years. Before that I was around in the county, Pulaski and Montgomery, not far away—around Radford back through that part of the country in Montgomery County. I have lived all my life near or about New River. I will be 74 my next birthday. General Wharton lived right near the Little New River town or right on the edge of Radford. It was Central Depot in them days. Wharton's mill was located just across the river from Radford right under the end of the railroad bridge.

I have seen boats on New River. I know of boats having been built and owned by General Wharton. He built 12 bateaux at

one time—keel-bottom boats. I couldn't say just when he built them. It was before I was married and I have been married something over 54 years. The boats that were built there were about 60-foot gunwales, about 9 feet wide. The sweep went 15 feet further—that is the oar that they guided the boat with. I don't know that I could tell you right plumb how much, but when they used to haul ore around there, they said four tons and a half was a good load.

I saw them hauling pig iron on the boats on the river running from General Wharton's mill down at the place I spoke of. I saw the pig iron on the boat where they would throw it off on the wharf. That was every year. They didn't haul that ore constantly. There was intervals they didn't haul any and there was times they run regular for awhile when the water was high enough to carry a load. They did not carry it every day or anything of that kind. Sometimes the river was too high to work on and sometimes it was too low to carry a load. I don't know as they did this work constantly. It was off and on, you know, sometimes they would haul for 4 or 5 months right along.

I don't remember whether there was a period of a year
365 when they didn't carry any. General Wharton built those boats for the purpose of hauling pig iron. I couldn't tell you whether he carried anything else on those boats. I don't know whether he carried any wheat or corn. That seemed to be the purpose of the boats. Some of the boats carried some little stuff along when they went up the river.

I had a boat of my own. I bought the last one of that bunch of Wharton's boats and had it for a year or two. I hauled lumber up the river. I took it from a sawmill at Hodge's mill—that is Wharton's mill—and hauled lumber from there up to Captain Moore's place. I hauled a thousand feet up there for one man but not all on one load. I was hauling hickory for W. C. Hodge up the river, and I would take some of that up one day and some the next until I finished. I was taking the hickory to the spoke factory at Hodge's mill. This factory is at the Wharton mill. I brought the hickory down the stream. I took other lumber upstream over Ingle's Falls and went up past where the Appalachian Electric Power Company's dam site is. I never took any merchandise up the river in my boat. I carried lumber only.

I worked at cleaning out the channel one season at what they called Fall Branch, right up about Howe's place, and the next year we worked from there up to Linkous' Ferry. We worked in the summertime. This work was done right along where the falls were too shallow for navigation. They had to make it deep enough.

I have run a boat on the river before the channel was cleared out and also afterward. I didn't notice anything no more than you would know pretty well where you were going with the channel cut out but lots of them channels filled up and made them bad, you know, and you had to run around some of them places. Stones that washed down the river filled them up. I can't tell you how long it took for the channel to fill up after it was cleared out. There was stone and other stuff which filled up the channel.

I recall that a boat got loose up around Dunkert's Bottom going to Pepper's Ferry. That was quite awhile ago. I can't say exactly when. This was a boat which Captain Moore made to convey stuff across the river. It was on the order of a ferry boat but not quite as wide. He carried horses, harrows, drills, and other things from one side to the other. Captain Moore was in control on each side of the river. He had a boat for the purpose of conveying stuff to and fro, you know, and a couple
366 of boys taken the boat for a boat ride that was going down as far as the river went to see how far it was down there, and they built them a house on it and got them a lot of stuff. They built a house on it and got a lot of stuff for themselves. They took the boat down to the railroad tunnel where it goes through the hill below Radford down below the horseshoe and they hung up there. They did not hang up there but decided they would go no further and sold the boat to Mr. Henry Barnard. Mr. Godby went down there looking for it. One of Mr. Godby's boys took the boat off and Mr. Barnard hired Mr. Godby and me to go and bring the boat back from down there. We went down and found it right there at the tunnel and brought it back, just us two. I think that boat was small—about 30 feet long, about 8 feet wide, and about 14 inches high. It was a flat-bottom and not a keel-bottom boat. It was used as a ferry across the river, but had not been built for that purpose. He sold lots of corn and took it over on that boat. In getting the boat back up the river we started abut one o'clock from down at the tunnel and got it back home up at Captain Moore's the next evening. We were a day and a half at Captain Moore's.

The witness on Cross Examination testified as follows:

I was working right at W. C. Hodge's spoke factory at the time they were building those boats for General Wharton which I mentioned. The builder was an old fellow named Joe Craft who lived in our country around there and Graysonton. I was about 19 to 21 or something like that at the time those boats were built. I was born in 1863.

The river was pretty rough there, every little while one of the boats would get demoralized and go out of business and break up

and couldn't use them any more and they dropped off by degrees. The last boating I remember them doing was about 6 or 7 of them. I got the last one and when this fellow failed that had the contract the last man I remember of that had the contract of bringing the iron ore down he failed—a man named Charlie Casey—his boats was sold at a sale. Charlie Casey was the last man in possession of them boats at that time. They were sold then to different parties afterwards.

W. C. Hodge bought this boat at a sale and I bought it
367 from him at the price he gave, for $15. The boat was a good boat. It was about half worn and about half as good as new when I bought it. I kept it like a man would a canoe. When somebody wanted a job done I would use the boat. I had no license. No license from the Federal Government was needed to navigate that stream. People was living free and all right them days. I brought about 250 or 300 feet of lumber up the river to Captain Moore's place from the Hodge mill.

When the Cripple Creek Railroad was being built some fellows came down hunting for some of the bateaux and I happened to have this one. They were men working for the bridge company there. They knew I had a boat and came down and I sold it to them for the bridge company up on the Cripple Creek road.

My boat was not the last one on the river. There was one or two more built after that but they were not as big. The boat that Redpath had was of another kind. It was the same make but not as large. I am speaking of the boats that General Wharton built which were used for boating iron. I never saw any boating of iron on that river after I sold my boat. There were no boats then at all. I can't tell you the capacity of those boats which were built for General Wharton. My understanding was that they were 10-ton boats. They could carry not far from 5 or 6 tons, about 5 tons was about their capacity and often they didn't haul that much because that couldn't be done without having a tide. Those were keel bottom boats or bateaux.

The witness on Redirect Examination testified as follows:

I bought the last of General Wharton's boats. They were not in his possession at that time and had not been for several years. They were something like 7 or 8 years old and had been half used. I never did much with the boat. I hauled a good deal up and down the river about two years or better. The boat had been run about 9 years when I sold it. I paid $15 for it to the man who was using it to carry pig iron and I sold it for $15.

Q. I believe you said there were other boats running on the river after you sold your boat?

368 A. Yes.

Q. But that there were no boats carrying pig iron?

A. No, sir.

Q. Was there any relationship between the fact that the railroad had come in there and that they had ceased to haul pig iron down the river?

Mr. ABBOT. I object to the suggestion to the witness.

The COURT. Ask him why he stopped hauling pig iron.

Mr. THOMPSON. I will withdraw that.

By Mr. THOMPSON:

Q. Why did they stop hauling pig iron on the boats?

A. I reckon they must have got the railroad closer and closer. The Cripple Creek was building then and it might have been—I don't know why they did. I think maybe the furnace stopped running for several years.

Q. So it was either the furnace or you think the Cripple Creek road coming in?

A. Yes, sir; it might have been.

The witness on Recross-Examination testified as follows:

I have no idea why they stopped the boating. Only the batch of boats we were speaking about had gone to the bad. The bottoms had been knocked out of them and they had been rubbed by the rocks and laid out on the bank by the rising of the river. I imagine that this boating of iron stopped a year before I bought my boat at Casey's execution sale. I sold it after that time to contractors building the Cripple Creek Railroad. The Cripple Creek Railroad had been built up in that neighborhood. The grading was all finished and they were building the bridges. I have nothing against this Appalachian man or any of them or against the Government.

ALBERT W. SNIDOW on Direct Examination testified as follows:

I was born on the 19th of September 1858 right where I live at Pembroke by the river, I believe 6 miles below Eggleston, by airline it wouldn't be over 3½, possibly not that far. It is in Giles County. There has been a ferry where I live ever since I can remember. It was changed a little after the Norfolk & Western was built. It used to run directly across the river north of my father's house to that large cliff called Castle Rock. There was a horseback landing up near the upper edge of that

rock. The edge projected into the water and was used for loading cattle. There was a kind of a hem there which
369 they used but the wagon landing was possibly 60 to 100 feet below that.

When I was a boy they would take cattle across on this ferry. That was all the transportation there was—driving cattle. Everything was hauled across on the ferry. After that the Norfolk & Western Railroad was built and it hauled cross ties and tanbark and lumber of all kinds.

I have seen boats on New River as far back as I can remember during the latter years of the Civil War, bateau boats. They had been running as far back as I can remember. At the Narrows there was a portion of the Army camped there over the winter and I suppose it was about the last winter, possibly, of the war. I can remember it. Yes and no, it was. I can't say just when the Yankees went through Pearisburg there. I don't remember exactly when that was but I think it was pretty well through the War—possibly the fourth year of the War.

I remember Captain Earl Burke. He was a white man who seemed to be in charge of the fleet of these bateau boats. He came to my father's house for a room to sleep in at night. He was there frequently but they did their own cooking. I wouldn't say that all of those boats had cooking equipment on them but some of them did. Sometimes they were loaded with barrels and sometimes with bags. I think they carried meal or something of that kind. I have seen them loaded with corn and also I have seen them loaded with lumber. I think their supplies were taken from what we called Central then—the old brick station in Radford.

Q. Can you tell me of your own knowledge how far down the river they took stuff in these boats?

A. It was general rumor all over the neighborhood there that they were carrying supplies to the Chesapeake & Ohio Railroad there that was being constructed in '72 and I can't say that I saw those boats land there at all but that was the general impression, the general talk of the neighborhood.

Mr. ABBOT. We want to interpose our objection to general rumor in the community.

By Mr. GATCHELL:

Q. Let us stick to the Civil War for a minute, now, Mr. Snidow. Do you remember the boats being used during the Civil War?

A. Yes, sir; I have a faint recollection. Of course, I was a small boy but I remember those boats passing down there during the Civil War, the latter years of the War.

Q. Was Captain Burke operating the boats at that time?

370 A. Captain Burke was in management. He was the Superintendent and those boats had about seven colored men to the boat. That was the crew and they kept steersmen, you know, that piloted the boats. He was on the back, what they call the deck. That was boxed up and he had his bugle. I remember that distinctly out there and he had a pole that he used under this left arm this way, but it had a metal socket on it and a spear and he dragged that pole after him under his left arm and manipulated this steering oar with his right arm and he was quick too.

Q. Where did he take the stuff that he had in the boats; do you know?

A. Generally to Hinton.

Q. That was during the Civil War?

A. Yes; about the close of the Civil War, I would say. Let us see—the surrender was in '65, in April, is my recollection. It may have been the summer of '65, but there was a large amount of corn that was hauled there on wagons, shelled corn, sacked up, and they built a foundation for it and it was packed up possibly ten feet wide or maybe a little wider. That was covered with a canvas cloth just like a show tent, and my brother that was several years older—he and a neighbor boy there were employed to watch that corn and I don't remember just how long but, of course, I was a small boy, but I went there frequently and would climb up on the mound, you know. I don't remember just how long, possibly ten days or might have been two weeks, and those boats came there and loaded that corn and went down the river with it. I don't know where they would go.

I think there were generally 6 boats in the fleet. Sometimes only 4. The last recollection I have of those boats was somewhere along as late as 1886 or 1887. They were going upstream. I don't know that they were loaded at all, but the last recollection I have of those bateau boats there is that they were.

Captain Burke had a room at our house. While he was boarding he was just in charge of these crews.

I never saw him have any difficulty in getting up and downstream. I remember seeing those boats go down loaded with loose hay once when the river was high. They were right in the middle of the channel. There is a little island or rock bar
371 in the river right below Pembroke bridge about 200 yards.

When the river got a rise of 4 or 5 feet those boats would go right down over the center of it. They weren't following the

channel on either side of that island at that time. They were right on the middle and they didn't use anything but steering oars. I think there were 4 boats there at that time.

The Snider Brothers were cousins of mine. They had a mill just below the Pembroke Ferry and were there three years, possibly 4. For a while they bought a great deal of timber and had teams of their own and of others to haul it in. They had a large mill and were cutting for the Norfolk and Western Railroad and shipping their lumber. They ferried it across the river. The Norfolk & Western loaded it there and it was shipped here to Roanoke. It was car beams and things like that. They constructed what you would call a boom. They went angling on the opposite side of the river and had wrought iron, half inch or a little heavier possibly, welded together with lap rings and they constructed a chain entirely across the river and mortiсed it into a large sycamore tree there and fastened it. These logs which they floated I think came from between Eggleston and Pembroke. I know that they bought the timber off of the Crawford farm and there was no road there. The timber was floated, but there was a boundary of timber on the opposite side of the river between Eggleston and Pembroke that I believe was known as the Snodgrass land. I don't know whether they owned it then or not. They may have owned it since, but anyway I think it was logged and rafted to Pembroke. I know Crawford's timber was. I know it is as much as 4 miles from the mouth of Sinking Creek to Pembroke. They may have possibly gone above Eggleston with the timber. These Snider Brothers carried on their mill operations at Pembroke for 3 years or a litte longer I think. They came there in '88 and I believe left in '91 or '92. I am sure they were there 3 years and possibly 3 years and 6 months.

I know a man named John McClarity, who was a soldier and lived just above Bluff City, Pearisburg Station, a great bend in the river there that the highway cuts off entirely from Bluff City to Ripplemead. He lived on the east side of the river
372 around that bend there from Pearisburg to Pearisburg Station, and was visiting there in the neighborhood late in November of '67 and he was taken violently sick with pneumonia and I believe typhoid fever. I am not sure about that. He had a very severe case of double pneumonia. Well, he lay there at the point of death, you might say, all winter and it was a very, very hard winter. The river was frozen and just a fearful winter, and in the spring of the year—I won't say how long, but after the weather broke up—opened up—one of those bateau boats came there and carried him off, carried him from the house in his bed and placed him on that bateau and took him down

there to, I would say, just above the Pearisburg Station. I would say that was 10 or 12 miles by the river.

I never measured those boats Captain Burke used to operate, but my recollection is that they called the four smaller ones 85 feet and the two larger ones 100 feet, including the rudder, the sweep, and the stern. They were made with keel bottoms, I would say with "gunnels" thirty inches high or possibly higher. The front end kinda flared up a little higher. The rear part the steersman occupied it with his steering ore altogether, and six others pushed along a gangplank and the loading was in between on each side. I can't tell you how much of a load they carried. One of these large boats might carry a carload. I don't know.

The witness on Cross-Examination testified as follows:

Q. Mr. Snidow, what year were you born?

A. I was born on the 19th of September, in '58.

Q. Now this testimony you have given about what went on in the Civil War, that is pretty hazy, isn't it; it has been a long time ago?

A. A child five years old can remember things as distinct as a man twenty years old. I can remember those boats as distinctly as I can a year ago. I might have been six years old. The War closed in '64.

Q. In September 1864 you would have been six years old?

A. I can remember farther back than that.

Q. Remember September '63?

A. Of course, I was a child and my father had a hired hand there and he and I would go to those boats at night and
373 I was a mere boy and of course those darkies were musicians and had a banjo and danced, and that attracted me, and I was at the boat often.

Q. Would they play the bugles at night with the banjos?

A. Sir?

Q. They had bugles on the boat, didn't they?

A. Yes, sir; the steerman kept it.

Q. At whose house did you say Mr. McClarity was sick?

A. He was a distant relative and there was a meeting at the church and he just came down home on a visit with some other young folks, and he was taken violently sick, and he never did get away from there until this bad weather broke up. It may have been the first of April or the last of March, but I remember they carried him from the house in his bed and placed him on that boat.

Q. Did you see those boats on the river constantly from that time to 1886 and 1887?

A. No, sir; during 1872 I know they were running, and the Chesapeake and Ohio Railroad was being constructed there, that big tunnel, I believe they call it the "Big Ben" tunnel and a whole raft of colored men around there that worked there that summer, and we had a darky around the place, I remember his leaving and going to the railroad and that summer now there was quite a lot of travel down the river with those boats.

Q. Is that the last year you saw the traffic on those boats?

A. No, sir. The Norfolk & Western Railroad shipped, it was said it was the Norfolk & Western—John Graham, I believe, we will call it him anyway, was in charge of the road and possibly a little work done on it in '79 and '80, it was working along, and I don't remember just when it went into the hands of the Norfolk & Western, but they pushed the work, but these two tunnels at Eggleston kept them from laying the track as far as Pembroke for a long while, and the Walkers Creek bridge is a pretty considerable bridge, well it was made a wooden trestle and that kept it back, I mean that held the laying of the track back to the mouth of East River you might say, and these boats were carrying heavy timber, of course I don't say they told me it was
374 trestle work, but that was the general talk of the neighborhood, that it was trestle work for the Norfolk & Western on the East River and Bluestone trestle.

Q. You don't mean to be definite about that, you saw something hauled down the river, but you don't mean to say that was bridge timber, for any of those trestles on the Norfolk & Western, do you?

A. I know*ed* it was the general impression of the people there, everybody was talking it, this is the bridge lumber. They hauled the Walkers Creek bridge timber there and unloaded it there.

Q. You mean it was hauled there by boat?

A. It was hauled there by those boats, yes, sir, because I don't think the Eggleston tunnel was through.

Q. And that is the reason you think it was hauled there by boat, because the Eggleston tunnel wasn't through?

A. I know it was hauled there by boat. I have rafted lumber over that fall there myself, I remember they wanted a commissary there about a half mile below Pembroke, and my brother and myself had a sawmill on the place, and they wanted poplar board, I think they were twelve feet, and we built a frame in the water about a mile above there and put these plank down this way and across, and I suppose we had a raft possibly that high (indicating), and stacked it up and nailed it down on the corners to hold it, and put a rope on it, and I led it there, I led the raft myself through the Falls, and my brother operated the boat.

Q. You mean you led it, how was that?

A. Had a rope tied to it, and I had a skiff right in front of it, and my brother was rowing the boat, and I just had the rope you know holding it, sitting on the back seat of the boat, and the raft was gathering so much power, you understand, than the smaller boat was, that it looked like it was going to lunge over, and I jumped up and grabbed hold of it this way (indicating) and held it against my breast, and I believe if I had not done it the raft would have gone over.

Q. What falls were those?

A. At Pembroke there.

375 Q. Below or above your ferry?

A. Right at Mr. Boxley's stone crusher there.

Q. Is it above or below the ferry?

A. It is below the ferry.

Q. It is not the Falls you see up the river from the highway bridge?

A. No falls of any consequence from the Pembroke bridge until you get around to the tunnel of the Norfolk & Western, what we call the "Horse Shoe" I suppose it is about two miles, one little ledge of rock that runs across the river, and with the exception of that it is all big water, and would run any boat between that point.

Q. Is the point you are speaking of the Falls below Dry Branch?

A. No, sir; Dry Branch is away up the river above Eggleston.

Q. You said between Eggleston and the tunnel.

A. I said between Pembroke. I am not very familiar with that water up there at all.

Q. You didn't boat any of these bridge timbers for the N. & W. bridge at Walkers Creek, did you?

A. Me.

Q. Yes.

A. No, sir; I didn't.

Q. You just saw them?

A. I saw them and it was conceded by everybody and talked by everybody in the neighborhood that is what the timbers were for, the East River and Bluestone trestlework.

Q. I thought you said awhile ago it was for Walkers Creek?

A. There was a wooden structure across Walkers Creek.

Q. Do you mean to say Mr. Snidow, the bridge timbers for the Walkers Creek bridge of the N. & W. and for the bridges below there were boated down the river?

A. Yes, sir; they were.

Q. Do you know where they were framed?

A. Well I don't know where the timber was bought.

376 Q. You never went with the timbers to the bridges?

A. No, sir; but on account of the Eggleston tunnel and on account of the Walkers Creek bridge being out and it is right in the river, a great wide place there, it was a considerable length, and those boats carried the lumber to build that bridge, and the bridges, so it was said, now of course I don't know, but I do know they hauled from the Walkers Creek bridge, it was general talk in the neighborhood and everybody conceded that was what it was.

Q. Did you continue to see those boats operating constantly on the river to 1886 or 1887, when you say this fleet went up and disappeared?

A. I never saw any boats after the N. & W. was run through except the three I speak of, that I remember passing back up the river, and the N. & W. had been in operation several years. I don't remember I had seen any of those boats for possibly two or three years.

Q. After the N. & W. came there?

A. Yes, sir.

By Mr. ABBOT. I want to state on the record an objection to all of this witness' testimony as to boating he did not see, and know where it was going. That is the testimony he gave based on rumors and common talk in the neighborhood.

The witness on Redirect Examination testified as follows:

Q. I would like to make sure of one point. Did you see boats going up and down New River after the Civil War, up to the time the N. & W. railroad went through?

A. I did in open weather. I never saw any boats during this time, I don't remember of ever seeing them go down but once in high water, and the river was possibly ten or twelve feet, and those boats were loaded with hay and kept right in the center of the river, no pushing about it, they simply steered them and passed on.

By Mr. ABBOT. At this point I want to make an apology, which I hope counsel for the other side will convey to Mr. A. W. Snyder, who testified here yesterday, and some insinuation was made about a statement he had made to us with reference to his age some years ago. It so happens the present witness and the other witness, although their names are not the same, both of their names are A. W. and I regret the instance.

377 By the COURT. You think it was this one.

By Mr. ABBOT. It was this one.

By Mr. GATCHELL. This man spells his name "Snidow."

W. P. SNODGRASS on Direct Examination testified as follows:

I live in Eggleston, Virginia. I have lived in sight of New River all my life. I was born in the southern part of Giles

ounty, close to the Montgomery line. I remember the Government doing blasting or river work on New River in the southern half of Giles County three miles above Eggleston.

Q. And how far upstream did they go?

A. You mean with that work?

Q. Yes.

A. I could not tell you. I don't know anything only our part in Giles County.

Q. How far in Giles County did they work, altogether about three miles?

By Mr. ABBOT. We object to leading the witness.

A. I know of three miles they worked.

Q. Have you ever seen any boats on New River?

A. Yes, sir.

Q. Can you tell us about what year you saw boats on New River?

A. All the time; from 1867 is about the first I memember of it.

By the COURT. How old are you?

By the WITNESS. Seventy.

By the COURT. And you remember boats in 1867?

378 By the WITNESS. Yes, sir.

By the COURT. That is pretty good, you weren't but one year old, were you?

By the WITNESS. 1877, I was mistaken.

Q. Was this before or after the Government improvements?

A. That was about the time of the Government improvements.

Q. Did you see any boats after the Government improvements?

A. Yes, sir; we operated the boats after the improvements something like twelve years.

Q. For about twelve years after the improvements?

A. Yes, sir.

Q. What attracted your attention to the boats?

A. I was living right in sight of them and could see them pass by and I was a young boy and that would naturally attract a boy's attention.

Q. How many boats do you remember seeing?

A. I could not tell you that. They would go back up the river ten or twelve year in constant work when the river would allow it. There was times they couldn't go sometimes, it would be too high, and sometimes it would be too low.

Q. Was your place in sight of the river?

A. Yes, sir; it was in sight of the river and looked right out over the river.

Q. Could you see what was on the boats?

A. I could not tell, it was passing by loaded, going down the middle of the current, and I could not tell what was on it, it was loaded, but I could not tell.

Q. When they came back were they loaded?

A. Not so much, it was down the river they were loaded.

I have seen as many as five at one time, but not often. I couldn't say where these boats stopped at any time.
379 Sometimes the river would be too high, and as the falls was right above us, they would land their boats in my father's keep there until the river would go down. The river would be tied up sometimes for a week and sometimes for two weeks according to the rain. Five is the largest number of boats I ever saw tied up at one time. Sometimes there would be only two or three tied up. They would be tied up pretty often.

Q. Could they get up the river all right?

A. They could when the river would fall.

Q. You say you remember they had boats down there for quite a period, how long a time was it they had boats on New River?

A. They were on till the Norfolk & Western built the road down New River, and there wasn't much boating after that. That was in '81.

Q. Along about 1881 there wasn't much boating?

A. Wasn't much after that.

I remember when they cut the railroad right of way through there. A man called "Contractor" Mills cut the two tunnels there within a half mile of each other. Most of the materials they got for the work on the railroad came down the river in these boats. I don't know where it came from. I don't know anything outside of our own county. They would bring down for the tunnels all kinds of dry goods, steel, coal, provisions to run a commissary and everything a contractor would use in construction work.

The first train came over that road on the 17th of May 1881 at 11:00 o'clock.

The names of some of the boatmen were John Neece, Lewis Ferrell, Tom Palmer, Hirman Palmer, a fellow by the name of Stewart and Mike Scott. That's about all I can remember. I never did measure one of these boats, but I would say they ran from sixty to ninety feet in length and were eight to twelve feet wide. The small boat was narrower than the large one and they were built in proportion.

The witness on Cross-examination testified as follows:

The Mr. Mills I spoke of was a contractor who put the tunnels in for the Norfolk & Western Railroad. He was connected with the firm of Mills & Roland, which had a contract for that
380 work. Part of their stuff was shipped down the river by boats. They bought some of it in the country, but some of it was brought down on the boats. I saw them unloading some at Mr. Mill's place. I did not see more than two unloaded there.

Q. I believe you said you first remember the boats in 1877?

A. The boats were running before that, but that is about the first I could make a statement to.

I saw a channel being cleaned out by the Government—I think it was the Federal Government—in Giles County. A man named Newburg was in charge of cleaning out the channel about 1876 or 1877. I couldn't say whether or not he was an army officer. This work was done in the southern edge of Giles County. I saw the Government putting a channel in Big Falls in 1876, I believe. I lived within a quarter of a mile of this work. Big Falls is on the line between Giles on one side or both sides of the river and Pulaski and Montgomery on the other. I also saw them cut channels below there in sight of our home. Where it was too shallow, they would throw the rock back and make a channel to run through, and come to these falls they would blow out a channel through the ledges that made the falls. I do not remember any wing dams to divert the water through the sluice there.

Q. Don't you think possibly you have gotten what you heard mixed up with what you have seen, did you ever hear the State of Virginia and Confederate Government cut some sluices down there in 1860 and 1861?

A. No, I do not think so. I don't think I ever heard that, all I ever heard was the Government was doing the work, I don't know if it was the Federal Government, State Government or what not.

Q. You think this work you saw done might have been done by the Confederate Government?

A. I didn't give it any thought where the money was coming from.

Q. You say you saw sluices cut through the Big Falls in 1876 by the Government?

A. I guess it was the Government back of it. I don't know who else it could have been.

Q. You saw men working there?

A. Yes, sir.

381 The witness on Redirect Examination testified as follows:

I remember the high waters in the late 70's—the big flood. The dredging out of the stream was done before that. The high water washed it away. It hit our place the 14th of September, 1878.

D. C. ALLISON, on Direct Examination, testified as follows:

I was born in January, 1859. I was seventy-seven last January. I was born on Reed Island Creek about two miles from New River. I lived there until I was about twenty-six years old. I went to Missouri after that. I was in Missouri in the middle part of the 70's and came back in four or five or six years.

During the first twenty-six years that I lived on or near New River, I didn't see any boats on it. The boats that I saw come up from New River up Reed Island Creek. I never seen a boat—not when I was a young boy. After I was grown I come up the river on a boat. I might not have been seventeen or eighteen years old. I rode on a boat in New River about the Cat Hole to the mouth of Reed Island Creek. That was four or five or six miles. I was running sawed timber down the rive. when the boats I was on come up the river. I didn't see timber or logs going down the river, but down Reed Island Creek to the river.

I cannot recall exactly, but I think it was in the last part of the 70's, when the Government improved the channel of the river. I don't know that I ever saw any boats or logs or lumber floated on New River before the channel was improved, but I saw them floating on Reed Island Creek to the river. We could not run a big raft down the creek. When we got to the river we put several thousand feet together and got it in the channel. I would be on it when it started down the river. That was sawed timber, but the logs they was cut and put in the creek and floated down and they went to the bridge. The bridge is twenty or thirty miles from the mouth of Reed Island Creek down to New River Depot and bridge. My best recollection is that it was twenty-five or thirty miles to the bridge. I don't know whether that is correct or not. It might have been a little less or a little more.

These logs were floated down after the channel was made.

382 Q. Did you see logs go down before the channel was made?

A. I have seen many go down Reed Island Creek.

Q. To the River?

A. Yes, sir.

Q. Did you see any boats on the river or ride on one, before the channel was made?

A. No, I don't believe I did.

H. B. ALLISON, on Direct Examination testified as follows:

I am a brother of D. C. Allison, who just testified. I was born and live on Big Reed Island Creek. I am sixty-seven years old and have lived there all my life. That is about two and a half miles from New River. I have been seeing New River for sixty-seven years.

I have seen keel bottom boats run up and down the river, traveled on some of them, but never worked on any of them. I think I traveled on them in the first of the 80's after the channel was built. I think the channel was built in the latter part of the 70's.

I remember the big flood. It occurred about this same time, I don't remember exactly.

We traveled on keel bottom boats about thirty feet long and eight feet wide at the top. They carried metal and pig iron down the river. Some of the pig iron was loaded near the mouth of Reed Island at a little wharf. Some of it came from Boom Furnace and some came from Radford Furnace and was loaded further down the river. Radford's Furnace was called Mack's Creek Furnace. I guess a boat would carry from three to five tons of pig iron. It depended some on the water in the river. They told me the pig iron was boated to Radford. (Defendant objected to the statement of the witness as being hearsay evidence and moved to strike it from the record.)

I didn't go down the river myself, but saw the pig iron go down.

I have seen boats come back from trips on the river. They were carrying groceries, sugar, coffee, salt, and small amounts of stuff like that. I knew several of the crews running the boats. I think it takes the crews about from two to two and a half days to get back on a trip. They would go down one day and it would take them longer to come back. I saw more than one boat running on the river with pig iron. I think for a while there were about two crews.

Q. Over how long a stretch of years did you see boats carrying pig iron and produce on the river?

383 A. I don't recall that, but it was several years—some five or eight or maybe ten years.

Q. During what years was it?

A. I don't just recall that, but somewhere after about the first of the 80's.

Q. The period in which you saw boats carrying pig iron somewhere down the river and coming back a day or two later with provisions, was a period of five, six, eight, or ten years?

A. Yes, sir.

They boated sawed lumber and shingles and rafted lumber in or around New River. I helped to raft lumber down the river. We rafted down Reed Island Creek to New River for three or four days until we got a large raft and took it to the railroad trestle about five miles down from the mouth of Big Island Creek. They built trestles out of it for the railroad. I expect I have helped to raft 150,000 feet of lumber down the river altogether during this period.

The witness on Cross Examination testified as follows:

Q. Mr. Allison, what year were you born?

A. I was born in 1867.

Q. What day?

A. The 20th day of January.

Q. How old are you, did you say?

A. Well, I was 68 years old the 20th of last January but they got a little mistake there in that statement and they have got it 67.

Q. And so you are testifying in conformity with a statement they gave you. Is that the idea?

A. Well, the statement where they—well, I don't know.

Q. Well, we would like to know. What statement are you talking about?

A. Well, it was a statement I gave when a man came to see me for a witness, and ——.

Q. (Interrupting.) Who was that—was it Ex-Senator Noell; who did you give that statement to?

A. I don't remember the man's name.

384 Q. And because you made a mistake in that, you are preserving it on the witness stand.

A. He made some mistake some way; I don't know how. I think I gave him my age correctly.

Q. How long did you say you saw these boats on the river?

A. Well, I just don't recall how long they was on the river, but several years, I think.

Q. Do you remember what year the channel was cut out as far as Big Reed Island Creek?

A. No, sir; I don't remember the date or the year.

Q. Can you say that you saw these boats on the river more than two or three years before, at the outside?

A. Yes; I think I have.

Q. You have to the question, but have you seen them, or have you already said that?

A. You mean seen the boats on the river?

Q. Yes; how many years did you see the boats on the river?

A. I don't recall now, but I think they was on the river five or seven years or some where—

Q. (Interrupting.) Five or how many?

A. Five or several years; I don't know how many.

Q. By "Several," do you mean less or more than five?

A. I think they must have been on there more than five.

Q. On direct examination you said from five to ten years.

A. Somewhere between five and ten.

I was not down the river to New River Bridge very often. I was up and down the river a good deal from the mouth of Reed Island down to what they called Clark's Mill, something like a mile and a half or maybe a mile below Hiawassa. That is where square lumber—rough logs sawed into square lumber—was floated down the river. I don't know how many miles it is from the

mouth of Big Island to Clark's Mill. I think it was close to five miles maybe, the way the river goes. I didn't measure it.

385 I never worked at the Radford Furnace on Mack's Creek. I have been there off and on all my life. I never hauled iron away from there. I was there with my mother when I was small when they were running the furnace and I have been there a good deal since. I never saw them making iron there, but I saw them hauling iron and passing the store where they had a commissary up at Radford Furnace, maybe a mile or three-quarters, or half a mile from the river. I never saw them hauling iron around the river. They taken it down to the wharf to load it on boats. I saw them load it there on the boats at Big Reed Island. I never saw them load it at Macks' Creek. I have seen them hauling iron down there and they claim they took it on the boats—that is all I know.

(Defendant objected to the statement of the witness as being hearsay evidence and moved to strike it from the record.)

Iron used to be hauled from Big Reed Island and Boom Furnace on Little Reed Island.

I don't know that I ever saw iron hauled from Boom Furnace to Pulaski by wagon or hauled across the river from about Allisonia on that ford by wagon. I don't remember iron being hauled across the river on the ice. I don't recall that I ever saw a wagon-load of iron ferried across the river from Boom Furnace.

Q. All of your recollection about the iron from Boom Furnace is that it was being hauled—I mean loaded on boats?

A. Yes, sir; iron there at the wharf; they had a little wharf, they called it, and they would haul it from the furnace and load it on the boats. I seen them do that.

Q. But you have never been along the river when they were hauling it away in wagons?

A. No, sir; I don't remember ever seeing them hauled that way. I may have seen it, but I don't remember it.

Q. How many boats have you seen loaded with iron at Big Reed Island Creek?

A. I don't know how many different boats, but I have saw several loads; I have also been on the same boats. I think they used two boats part of the time, and I have seen them.

Q. You have seen them load a boat several times, but whether or not it was the same boat, you don't know. Is that correct?

A. Yes, sir.

386 Q. You said something about it took two or two and a half days to make a round trip from the mouth of Big Reed Island to Radford. You never took that trip, did you?

A. No, sir; but I was well acquainted with the crew that did take it, and that is the time they said it taken them to come.

Q. Are you sure they didn't tell you it took one day to go down and two to come up?

A. Well, some days probably it would, but they would come back some days earlier; it didn't take them so long some days, and they would have good water in the river and they could make it quicker, they told me.

Q. But better days going down would be harder days coming up, wouldn't they?

A. No. When there was plenty of water they said they would handle the boats better.

Q. And when there was plenty of water they would do it in from 2 to 2½ days?

A. That is what they said.

PAUL L. JAMES testified upon Direct Examination as follows:

I reside in Washington, D. C. I was born at Kane, Pennsylvania. I have spent most of my life on New River at Hinton. My father took me to Hinton to live when I was about two years old, and I spent almost all of my life at his home there until his death. After that I was there most of the time except for the period when I was in school during which I was away temporarily. I have probably been away 10, 15 or 20 years in business for myself. I am 63 years old.

My father was in the lumber and logging and building business—stave business. He had his saw mills and planing mills at Hinton and converted timber into building material. I was connected with his lumber company in later years when I became old enough. I was bookkeeper and secretary and treasurer of the organization. From the time I was old enough to do any work at all I was brought up in the saw mills, planing mills, and offices of the company. At first it was a partnership between my
387 father and his brothers. The firm name was William James & Sons. After a number of years it was incorporated under the name of the William James Sons Company.

We had a mill at Hinton. We cut lumber all along the line of the New River or Little Blue Stone and some on the Greenbrier, and anywhere we could get it. When I was a boy there was a great deal of timber, saw timber, and ties and a lot of logging done on that river. The Standard Oil Company was buying a great many staves there. The C. & O. was buying white oak ties and we were buying white pine, white oak, and spruce.

All the timber we could use was saw timber. My father bought nearly all of the timber on a stumpage basis, delivered on the banks of the river. My uncle and my father bought timber

wherever they could. I heard them speak of going up as far as the Narrows and up Little Blue Stone and Big Blue Stone and anywhere along the three rivers that they could get timber.

(Defendant moved to strike out what witness had heard.)

My father was the business manager but my uncle, or his brother, T. W. James, largely took care of locating timber, and if he did not make the contracts outright he would contact the timber people with my father. He spent all of his time in the woods.

I did not go into the woods myself purchasing timber. I was the bookkeeper. When I was old enough to keep books I did so and kept records of these purchases, so that I was familiar with the purchases which were made.

Q. How were the logs which you say that your uncle purchased up at the Narrows brought to Hinton?

A. Floated down the river either in rafts or loose.

Q. How many logs would you say that your firm floated down the river a year to Hinton?

A. I know in a general way about what my father tried to handle.

Q. I will ask a further question. Were records kept as to where these shipments came from?

A. Oh, yes.

Q. Did you have knowledge of where these shipments came from, so far as keeping the records were concerned?

A. As far as keeping the book accounts were concerned.

Q. How much stumpage would you say was floated down
388 the river by your firm a year?

A. And cut at our sawmills?

Q. Yes.

A. Regardless of where it came from?

Q. That is right.

By the COURT:

Q. He does not mean what was the total cut of you mill, but your best estimate of about how much you were accustomed to get each year which was brought to the mill by floating down the river?

A. Well, from two and one-half to three and one-half million feet would be my estimate of it. Sometimes it would run more than that and sometimes less.

By Mr. THOMPSON:

Q. How many years did that cover?

A. Well, my father went to Hinton in 1870. I would say 45 to 55 years he was in there operating.

Q. You didn't have direct knowledge as a bookkeeper of the shipments that were made in the early days?

A. Oh, no; I had to go to school and learn bookkeeping. I was only a child when he first went there.

Q. State whether or not your company ever purchased or gathered logs at what is known as Sandstone Falls on New River or near that vicinity?

A. We had gathered our own logs and the logs of the St. Lawrence Boom Manufacturing Company at Sandstone, Kanawha Falls and as far down the river as Charleston.

Q. Did you ever do that yourself?

A. Yes, I have been down the river myself.

Q. You personally went down there?

A. Yes.

Q. Who else in the firm went?

A. My father generally attended to that.

Q. And what did you do with those logs which you
389 got down there? How would you get them to shore?

A. They were generally picked up by different people along the river and rafted and we would sell them to some sawmill and ship the lumber or sell the logs.

Q. Where would you ship the lumber to?

A. After I went to keeping the books, my father went to Columbus, Ohio, and opened a retail lumber yard and we shipped practically all of the lumber we sawed that ran through our planing mills to Columbus, Ohio, but we had business all along the river and we had business in Boston and Cincinnati. We shipped lumber wherever we could sell it.

Q. And you gathered lumber, as I understand it, not only at Sandstone Falls but at other points down the river as far as Charleston?

A. Yes, Montgomery, Kanawha Falls, Sandstone, and Charleston were the four principal places that we could dispose of the stuff easy and that is where we would collect it.

Q. And some of that, as I understand you, you shipped direct to Columbus, Ohio—some of these logs?

A. Not logs—the cut lumber.

Q. How did you know that those logs which floated down were your logs?

Mr. FORBES. We object to the form of the question. There was nothing to indicate that he did have any way of knowing.

Mr. THOMPSON. I will withdraw that.

Q. Was there any way of your knowing?

A. Yes, whenever a log was taken up an measured in the woods or on the river bank, we had a "J&S" that was stamped on both ends of the logs.

Q. What did J. & S. stand for?

A. James & Sons.

Q. Was that a custom with the other lumber companies?

A. Yes, every logging company that did any logging on the river had their own private marks.

Q. Did you ever have and business with respect to logs of other companies?

390 A. Oh, yes.

Q. That went down that river?

A. Yes, sir.

Q. Please state what business you had.

A. We would take their logs and ours and treat them as one and keep count of the board measure by the marks on the end of the logs. We would measure by the marks on the end of the logs. We would measure the log and see how many thousand feet it had in it and if it had our mark on it we would take credit for it and if it had somebody else's marks on it, we knew all the marks on it, we knew all the marks on the river.

The lumber which we dealt in was saw timber. We sawed most of our ties at the mill. Occasionally, we would buy a few ties. We had a few stave mills but we didn't handle staves at the Hinton mill. Our stave mills were portable and we would take them to a good stand and saw up the staves. These stands were on parts of the Greenbrier.

Everything that came off the Bluestone and New River and Little Bluestone generally came in the form of logs and went through the usual course of our booms to the saw mill and was sawed there but sometimes it was handier to cut the staves and haul them out on the boats or wagons or in any way we could get them out.

The Standard Oil Company was buying staves there largely for oil barrels. I saw a great many staves in boats on the river for years.

Our lumber was handled largely as logs but what lumber was handled there was either handled in a raft or on a bateau.

A bateau was a round bottomed boat, partly flat, with running boards on the inside. It was about 10 feet across and 55 or 60 feet long and was pushed up and down the river by hand power. These boats were sharp at both ends, with an oar paddle on each end to steer them. I have forgotten the capacity of one of these boats. My best estimate is 10,000 feet board measure, depending on whether oak or pine was carried.

The photograph marked Government Ex. No. 2 which you hand me seems to be a picture of a picnic. There is a bateau in the picture such as often was used for such parties. I recognize one

man in the picture as Mr. Hobbs. He is the man with whiskers and a straw hat. That is his wife sitting next to him. The
391 type of boat known as a bateau was commonly used for transportation to all points. The bateau in the picture, I think, is an ordinary one, 55 or 60 feet long, with 8 or 10 feet beam, drawing probably 18 or 20 inches of water and 3 to 3½ feet deep (photograph offered marked Government Ex. No. 2). The photograph marked for identification Government Ex. No. 3 which you hand me shows another bateau with 22 or 23 people in it.

Mr. FORBES. Did he identify any of the people in that bateau or identify that bateau as a bateau on New River?

Mr. THOMPSON. No; he is only identifying it as a type of bateau. He has identified parties in the boat.

The photograph which you hand me marked for identification Government Ex. No. 4 is another bateau, with 30 or 32 people in it. (Photographs offered in evidence by plaintiff—marked Government Ex. No. 3 and No. 4.)

I have seen steamboats on New River over most of my lifetime. I saw the first one when I was a child. I lived within 100 feet of the river bank on New River and there was very little as a child that was going on which I did not see.

There were a great many types of boats, but three or four boats were made into steamboats over the period of my lifetime there. The first one I can remember my father showing me I remember had paddles on the side of it. That is about all I remember about that boat. I can remember it was boarded up at the side and had side wheels. I don't remember that it had any decks. My estimate is that I saw that first boat 50 years ago. It must have been about 1877 or 1878.

Q. When did you see any other steamboat?

A. Well, from that time on there was always somebody working with a boat, running it up and down, trying to convert power on these bateaux. The bateaux were always the method of transportation of freight back and forth on the river and somebody was trying to introduce a power that would save this manpower in going up and down the river and that was being done by different people. I remember my father, I think, was one of the originators of that first boat company and then when I was older, just about the time I was going to school, I remember there was another boat.

392 Q. When was that, about?

A. That was about '88 or '89.

Q. What was the type of that boat, if you recall?

A. That was a flat boat, also with these side wheels on it, steam or electric power. I don't remember which it was.

Q. And do you recall how long that boat ran up and down the river?

A. No, sir; I don't remember. I just remember seeing it. I never took a trip on the boat.

I remember that after I went to school and came back Mr. Hobbs had a foundry down there. They were building a boat and working on the engine. That was about the last one I remember anything about. I saw that boat running on the river.

I don't remember a Captain Davis. I can remember the Davis boat but I don't remember the boat. I was away at school at that time and only home on vacations and didn't see so much about it. I saw such a boat but don't remember it. I don't think the boat I saw in 1888 was the same boat. I think the Davis boat was a later one. I remember seeing a boat partly capsized and I think that was the Davis boat.

Q. I hand you a series of photographs marked for identification Government Exhibit Nos. 5, 6, 7, 8, 9, 10, and 11, and ask you to look them over and say if you know what those photographs represent as pictures?

A. Well, there was an attempt made, and I think by the Hobbs boys—as I said awhile ago, they ran a machine shop right on the river bank and they were all the time working on different boats. I think they made an attempt to and did——

Mr. FORBES. We object to what he thinks.

A. All right. I know that they put one of these aeroplane power plants on a bateau.

Q. Power plants, you said?

A. I said they put one of these power mechanisms on a bateau and used it as power for that bateau instead of the pole, going along as manpower. These are just photographs of the same thing.

Q. State whether or not you ever saw a boat of the type as represented in those pictures on the river?

393 A. Yes, I have.

Q. Was it running or not?

A. Not running when I saw it. It was at the Hobbs foundry, right at the boat landing. That was one of the later types of boats.

(Plaintiff offers in evidence photographs marked for identification Nos. 5 to 11, inclusive.) The photograph or kodak picture which you hand me marked Ex. 12 for the Government shows one of the last boats I think I ever saw on the river which was built by these same Hobbs boys. I have seen that boat on the river. I would say that its length was 30 feet. Of the two boats in the

picture the one I am referring to is the one with a black bottom and upper white rim. That was a motor-driven boat.

The photograph marked for identification Government Ex. 13 which you have handed me shows one of the first boats. I think this is a boat belonging to the stock company which my father and some of the earlier settlers there organized. What attracted my attention to the boat was the propeller on the side.

By Mr. THOMPSON. Someone put a newspaper clipping on this picture on the back, and we ask that it be disregarded. We had nothing to do with that, and didn't know it was on there.

By the COURT. When were those photographs Nos. 5 to 11, inclusive, supposed to have been taken?

By Mr. THOMPSON. I don't know. All I know is where we got them, but I don't know when they were taken, but the witness has testified he knows people in the pictures.

By the COURT. I mean the small pictures.

By Mr. THOMPSON. The best recollection I have of them is about 1912. Counsel object to what is on the back of this picture,
and I think rightfully so. We offer this in evidence with
394 the suggestion that any thought about what is on the back of this picture be excluded. We will try to blot it out or remove it.

Q. I think you testified that your company moved about from two and a half to three and a half million feet of lumber a year, is that right?

A. Yes, sir.

Q. Are you able to estimate what other companies moved on the river during the years you were there?

A. It would only be comparative to what they were doing and what we were doing. I would give an estimate of the staves and what other lumber and ties was.

Q. With that qualification, please state your best judgment about it.

A. I would certainly think we handled a third of the business on the river. That would make somewhere between seven and ten million feet handled on the river.

Q. How many years would you figure there was such an amount of timber on the river?

A. We were in the business there about forty-five or fifty years. I would say about forty years.

Q. When you cut lumber and shipped it, would you ship it on order to some destination or take some chance on it?

A. Took all the chance. We bought the logs as I said delivered on the river side up maybe thirty or thirty-five miles from us, floated them down the river, cut them into different size timber and converted them into mouldings, window jams, etc., and

shipped them where we could, and when I got big enough to run the mill we shipped everything mostly to Columbus, where our retail yard was.

Q. Prior to that had you ever shipped to any other cities?

A. Yes, sir; we shipped a great deal of oak for the manufacture of furniture, we went into the northeast, Boston was a big buyer, they used to take it up and measure it at our place.

Q. Did those buyers come to Hinton?

395 A. Some did and some of our regular customers we would ship a carload of lumber.

Q. Would that be on order from them, or how?

A. Yes, sir; on order from them. We cut a great deal of bridge and trestle timber.

The witness testified on Cross-Examination as follows:

I was not born in Hinton but went there when I was two years old. That was my father's and my mother's home. My mother died about 7 years ago and my father about 12 years ago. I went there during the summer; then all through the period I was in business down on Cabin Creek, 8 or 10 years, and have been in the coal business, but I went back to Hinton off and on all my life. I lived there continuously from the time when I was two years old to the time when I went away at school. I was about 16 or 17 years old when I first went away to school. I was away from Hinton in school three or four years but returned there each summer.

I was the bookkeeper and office manager. We did a lot of building in Hinton and summers I worked at the carpenter's trade and sawmill. I was brought up in the mill. After I had been away at school three or four years, I returned and was continuously identified with my father's business until I was 33 or 35 years old and then I was in the coal business in the county adjoining us. My father was in this coal business with me and I took charge of it, but Hinton was our headquarters at the same time. I would say my life was spent at Hinton for the first 38 years almost solid and intermittently between that time and the time when I was in the coal business downstream from Hinton, and that was ten years more. The coal business had no connection with the lumber business.

When I was a child the first boat I ever saw was a steamboat about 1877 or 1878. I saw it at the landing which they call Hinton's Ferry, a ferry operated right in front of our house. That is the deepest water from there down to about a half a mile in where the lumber and ties and boats and bateaux tied up. I never rode on that boat. I never saw the boat upstream above Hinton.

I have been in bateaux and taken them and chartered
396 them and run them up the river, but not a steamboat. The farthest I ever went up the river on a bateau was the mouth of Bluestone, six or seven miles from Hinton. We floated our logs on the river and did not handle them in bateaux.

I don't remember the name "Cecelia Miller" in connection with this boat I mentioned having seen in 1877 or 1878. That is the boat there (indicating on picture marked "Ex. 13"). I remember seeing 3 or 4 boats built along during my life. I never rode on them. I mention another boat which I identify with the year 1889. I don't know whether this was a steamboat or gasoline motor boat. In characterizing it as steam or electric I mixed up electricity and gasoline. They were gasoline or steam boats I saw on the river. The boat I mentioned having seen about 1889 was a flat bottomed boat with paddles on it. I don't remember whether it had a particular name. I said I thought it had been built by the Hobbs at the Foundry. I don't know whether or not it was a pleasure boat used for picnics.

When I said I went to the mouth of Bluestone, we would hire boats for pleasure and go up and back in a day. We would take our girls along. That was a very favorite way of spending a day from Hinton, taking a bateau up the river.

I know where some of the logs floated on the river were put in the water—some in the Bluestone, some in the Greenbrier, and some originated at those points. I had one uncle whose particular business was to go around and buy these logs and we bought them on board measure and they went down to the mill and sawed. Sometimes the logs were brought a certain distance together in what we call rafts, 50 or 100 log rafts.

I saw some staves brought down the river on bateaux. Bateaux were continuously unloading those staves right there where I lived. We had one stave mill of our own, really more than one, that was up at Greenbrier. As I remember my father cut staves but from the time when I really remember we were cutting staves and bringing them down the river on bateaux and hauling them by wagons.

Q. I suppose you selected the method that represented the shortest route to where you wanted to go?

A. Probably the cheapest.

Q. As shortness bears on cheapness?

397 A. Yes, sir; and up the river, and Bluestone, they always used bateaux because that was the cheapest way to get down.

I think I have seen the Davis boat. I heard about it when I returned home from school. I saw three or four boats but I could

not tell you just the name of the boats. I never connected the name Davis with any boat.

I was interested in the lumber company whether I was there all the time or not. I had been in the lumber business 45 or 50 years. My father and his brothers were in it before me. I had not been in it myself for that length of time.

I have no records which show the amount of logs and timber that our company brought down the river. After my father's death those books were kept a few years but I really don't know what became of them. My memory is very clear as to how my uncle used to bring in those log books. He would go to the woods, take his log rules and measure them and stamp them and when they came into the mill it became a board proposition and we sawed them up into boards. We stamped the initials "J. S." on the logs. We were cutting logs continuously over that period where we could get the timber.

When a log got to the sawmill I couldn't tell whether it had come down the New River, the Bluestone River, or the Greenbrier River. Our logs which were hauled by wagon were also initialed "J. S.".

My estimate of the amount handled through the books came from my general experience closing the books over that period of years. Ninety-nine percent of our timber came by water at that time.

Q. Were you concerned at that time by allocating the method, how it was sent?

A. I arrived at the feet we cut over a period of years and the average cost and sales price.

399 JOHN H. PETERS testified upon Direct Examination as follows:

I reside at Washington, D. C. I was born in Monroe County, West Virginia, and will be 70 years old the 15th of next September. I lived in Monroe County about six years until we moved from there over into Mercer County, West Virginia. I have been on New River practically all of my life.

When I was a young man my father and I ran boats up and down the river for a good many years. My father had charge of the boats and I went along with him to see after them. I never owned any of the boats on New River myself.

My father had six boats at one time, I think. They were called bateaux, and were 66 feet long. We built some of them ourselves. In the center they were about 8 feet wide. Referring to Exhibit No. 2 which you hand me and which contains a picture of a boat, this is the type of boat I was speaking about and is called a bateau. The capacity of these bateaux in carrying lumber was

about 10 or 12 thousand feet of lumber as it came from the saw mill.

The town of Glen Lyn is located in Virginia at the mouth of East River. I have been to Glen Lyn on my father's boat looking after his interests. My father sold his boats after so long a time. While he had them we hauled trade up and down the river from Hinton to Glen Lyn and we made one trip clear to Radford. From Hinton to Glen Lyn we carried mostly stuff for the Norfolk and Western when they were building the railroad there.

We carried groceries of all kinds up to the Salt Works, which is up the river from Hinton about 22 miles on the right-hand side going upstream. There were stores up and down the river which had country trade. We hauled stuff up and down the river for them. When they shipped stuff out we took it.

On the trip down from Glen Lyn we hauled mostly tobacco and some fertilizer. I couldn't state just exactly the date when we hauled fertilizer. It has been so long ago I cannot remember the date. It was when I was a young man. We brought fertilizer down from Glen Lyn for about two or three years. It was distributed along at different places down the river as we came down. The fertilizer came from Dublin, across there to the mouth of East River. I do not think any of it came in on the Norfolk & Western.

Some of the materials which we carried for the Norfolk & Western was boxed up. I don't know what was in the boxes, but we hauled powder and dynamite, picks and shovels, and stuff they used on the railroad. That was when the Norfolk & Western was being built.

I took trips myself on the boats. I had several darkies working for me on these boats. I don't know whether I could recall the names of all of them or not. We had some of the Medleys and some Smiths, and there was one by the name of Tom Agee. These men moved those boats with poles. We had three men on each boat.

Q. I believe you stated you made one trip up to Radford?

A. Yes, sir.

Q. Please state or describe that trip to the Court?

A. Of course, I wasn't along with the trip, but we moved——

By Mr. ABBOT. We object to anything that he testifies about the trip. He says he was not along.

By Mr. THOMPSON. He said he was not along with the trip, so I will withdraw that question.

Q. Did you ever move a man or contract to move a man to Radford?

A. Yes, sir.

Q. From where?

A. From Crump's Bottom.

Q. Who was that man?
A. John G. Crockett.
Q. And what were you doing for him?
A. We were moving his household furniture to Radford.
Q. Do you know as a matter of your own knowledge that you did move him?
A. Yes, sir.
Q. And whom did you move on that boat?
A. John G. Crockett.
Q. Was his family with him?
A. No, sir; they weren't along, but we moved his household goods.
Q. Did your men go on this trip?
A. Yes, sir.
Q. State whether or not you were paid for moving Mr. Crockett?
A. Yes, sir; we were.
Q. Who were the men that moved him if you remember, I mean of your men?
A. There was two Merchants.
Q. You mean the Merchant brothers?
A. Not brothers, one was the old gentleman and the other was the son.
Q. Were they colored men?
A. Yes, sir.
401 Q. Who else?
A. I think this man Agee that I have been telling you about was along and a man by the name of Roach.
Q. Do you know whether a man by the name of Smith was along?
A. I think there were two Smiths.
Q. How long were you on the river with the boats?
A. I was on there, I guess—I couldn't say, just exactly, but about 16 or 18 years.
Q. During that time were you going up and down the river?
A. Yes, sir; we made trips up and down the river pretty nearly every week.
Q. How often would you go to Glen Lyn?
A. While they were building the Norfolk & Western we made a trip up there nearly every week.
Q. And how often would you go when you were getting the fertilizer?
A. We would only go about one trip up there in the spring.
Q. And why did you go in the spring to get fertilizer?
A. Because the people raised tobacco in that country and they used fertilizer for raising the tobacco.

Q. Do you recall whether you made trips at any other time to Glen Lyn other than for fertilizer and for carrying materials for the Norfolk & Western?

A. Yes, sir.

Q. You did?

A. Yes, sir.

Q. When did you do that?

A. That was just about before the Norfolk & Western was built. We moved from there——

Q. From where?

A. From up there at Glen Lyn.

Q. Did you ever live at Glen Lyn?

A. Right close to Glen Lyn.

Q. How close to it?

A. About two miles.

Q. Which way?

402 A. Back northwest from the mouth of East River.

Q. You were back from New River?

A. Yes, sir.

Q. You moved from the junction of East River and New River to where?

A. To Mercer's Salt Works.

Q. That was across the State Line?

A. Yes, sir.

Q. You have no recollection of boats moving up and down the river prior to the Government doing work on the river; or have you?

A. Yes, sir; boats ran up and down there all the time.

Q. As far back as your memory goes?

A. Yes, sir; as far back as I can remember.

I worked opposite the Salt Works in one of the channels when that Government work was done. The work consisted of opening a chute through the falls. I can't say that it facilitated the movement of boats up and down the river. It helped in a way in getting up the river but it did not help in getting down the river.

Boats did go up the river before there was a clearing of the channel and they continued to do so after the clearing of the channel. The Government work made it easier going up but did not necessarily improve the river for coming down.

I think I have seen a steamboat moving on the river, called Cecelia, two or three times. I don't know whether I can describe it exactly or not. I could not give you its dimensions but I think it was about 50 or 55 feet long. I think it had two side wheels and one back wheel. I think there was only one pipe or smoke stack on it. It had a whistle which I have heard.

This steamboat hauled freight and passengers up and down the river. Tobacco was about the only industry that the farmers worked at. Everybody raised tobacco. They got the tobacco ready for market and brought it to Salt Works and different places along the river and we boated it to Hinton. I can't give an estimate in pounds of the amount of tobacco I boated down the river, but it was up in the millions of pounds.

The witness testified on Cross Examination as follows:

My father owned five or six bateaux. They were built way back yonder. I don't recall just when but I would say it
403 was after 1878. I think they were built about 1885 at Mercer's Salt Works. I helped build them. He was running the store there. I did not build them all myself, because we had other carpenters.

My father ran these bateaux for twenty years or more. He has been dead about 12 years. He ran them until somewhere along in 1905. When he got through with them he sold them to different persons along the river down there. I think one went to a man by the name of Lily and I think one went to a man by the name of Frazier. I think he had more than two to sell at the time he sold these boats. He didn't sell all the others at that time. He still ran them up and down the river. But there came a time when they were all out of his possession. The others were sold later on, I couldn't say just when.

When we moved to Mercer's Salt Works I was about 15 years of age, I believe. I will be 70 years of age my next birthday.

Q. You stated that you yourself did not move Mr. Crockett to Radford?

A. I did not go with the boat myself.

Q. Did Mr. Crockett pay you before he left, or I mean, did he pay you the money for the trip before the bateaux left up there?

A. No, sir; he was to pay us and did pay us after the work was done. He still stayed there a good while after his stuff was all moved.

Q. Do you remember the year in which he was moved by some of your father's boats. You said you did not own any of the boats yourself?

A. No, sir; I did not own any boats myself.

Q. What year was he moved by your father's boats?

A. I couldn't say.

Q. What is your best recollection about the date or rather the year?

A. It was in the nineties, I think, 1890 something, I cannot tell you for certain, because I don't recollect those dates, but I know the boats went up there, though.

Q. Your father was alive at that time?
A. Yes, sir.
Q. And he owned the boat?
A. Yes, sir.
Q. Did Mr. Crockett pay your father?
A. Yes, sir.
404 Q. That is, he paid your father or paid you?
A. He paid my father, which was the same thing, because I was looking after them for him and whenever there was a bill coming in I would know it.
Q. And you handed it over to your father when it was paid?
A. Yes, sir.
Q. Do you know whether he paid it by check or cash?
A. No, sir.
Q. I suppose if the money or a check was handed to your father, you wouldn't know which it was?
A. I wouldn't know which it was now; no, sir.
Q. And the fact that your father was paid, is based upon what your father told you, I assume, that he was paid for the trip?
A. No, not exactly that, because I was generally there when those transactions took place, because I was interested in them.
Q. You say "those transactions." There is only one transaction involved here, isn't there, the payment to your father?
A. Yes, sir.
Q. And you were present when your father was paid? I understood you to say a moment ago that you were not present and that you did not see whether a check or money was handed to your father?
A. I don't know whether it was paid in check or paid in money. It has been so long ago I have forgotten all about that, but I know it was paid.
Q. You have an impression, however, that it was paid?
A. Yes, sir.
Q. I suppose Mr. Crockett was a man of good repute, and a man that ordinarily paid his bills?
A. Yes, sir; he stood mighty high, Mr. Crockett did.
Q. Now you say you saw boating on the river before the Government did this work on the river?
A. Yes, sir.
I can't recall the year the Government commenced working up there. I don't know how old I was when the Government started the work on the river. I was large enough to be able to do
405 a man's work. I was living at Mercer's Salt Works at that time. My father did not do any work on the channel. He was running the store. My father also had a farm up on East River. Farming was not my principal occupation but I worked

on the farm there and worked on the boats, when there was boating to be done.

Q. You mentioned a little while ago that you made these trips by boat to Glen Lyn. As a matter of fact, the majority of times you did not get to Glen Lyn by boat, did you?

A. No, sir; not the majority of times.

Q. The majority of the time you had to stop your boat below the falls, didn't you?

A. Yes, sir.

Q. And you unloaded your boat there. Isn't that a fact?

A. Yes, sir.

By Mr. THOMPSON. What falls are your speaking of, Mr. Forbes?

By Mr. FORBES. Shumate's Falls.

A. When we could get up we went on up to Glen Lyn, went up in East River and unloaded up there in the East River.

Q. The Government did not cut any channel through Shumate's Falls, or did it?

A. No, sir; it never went that high.

Q. Where did you unload in East River on the occasions when you did get up there by Bateau?

A. I don't know whether you would understand it now or not. Do you know where the Ford used to be in East River?

Q. What ford?

A. There is a kind of a bridge I reckon across there how. I ain't been there for years, but it was right down off from the depot, right opposite that old bluff as you go in the East River.

Q. Was there a landing there or a wharf?

A. No, sir; that water was deep in there and we would run up in there and unload right on the bank.

Q. Was it further up the creek than Mr. Shumate's house at Glen Lyn? Do you know where Mr. Shumate's house was?

A. You mean the man that run the store there?

Q. The one that had a brick house; yes, he was the man that run the store?

A. He didn't have any brick house there.

406 Q. You are sure of that?

A. Yes, sir.

Q. Did you ever see any brick house in Glen Lyn at that time?

A. I think there was one over there. There was a widow lady there by the name of Mrs. Hale.

Q. Do you know where Mr. Shumate lived, who ran the store?

A. He lived in one end of the store.

Q. Where was this brick house in which Mrs. Hale lived with reference to the store, which direction was it from the store, and how far?

A. It was south of the store.

Q. How far?

A. About a quarter of a mile, I reckon. Shumate's store was right on what they called Adair's Run.

Q. Was there any other store there at that time besides Shumate's store?

A. No, sir.

The point at which I worked in the channel was right across from the Salt Works. I worked there for two or three months, from some time in July until the water go so cold that we had to quit.

I don't remember how much Mr. Crockett paid for the movement of his household goods.

I guess I have seen the boat called "Cecelia Miller" three or four times up there. It came up to the mouth of Lick Creek. I don't think it was on the river very long. I think just a few months. I never seen it stalled on the river because I never went along with it. I would judge this boat was about 55 feet long. It might have been 60 feet. There was some kind of a little house built on it. It had a kind of a deck but I couldn't tell you what it was because I just looked from the bank when it was going up or down the river. I couldn't tell you whether there were one or two decks. I know there was something built there for passengers to sit under and on, but I couldn't say what it was. I did not see the "Cecelia" carry merchandise up and down the river myself. All I know is just what people told me.

Q. Now these trips that you mentioned a while ago on which you went to Glen Lyn, as a matter of fact, you did not go on many of those trips yourself, did you?

407 A. No, sir; I didn't go on all of them; no, sir.

Q. How much of the time was there that you had to unload your goods below the falls?

A. About two-thirds of the time.

Q. You said you tried to run once a week. I suppose, as a matter of fact, there would be two or three weeks or several weeks at a time in which you did not run, and sometimes as much as five or six weeks?

A. Sometimes in the winter time when the river froze up we could not run up the river.

Q. But aside from the time when it was frozen over, ther' were other times when there would be several weeks that you did not run. You don't mean to say that you went every week up to Glen Lyn, did you?

A. No, sir; I do not. I couldn't recall that we went every week but we went lots of times.

Q. And then sometimes you would skip a few weeks?

A. Yes, sir. Whenever we got a load of stuff for the boat to go up there then we commenced to haul.

Q. But quite often there was nothing there to haul?

A. Pretty nearly all the time there was something to haul up there.

Q. But it was a question of whether or not it was an advisable time to get up there?

A. It depended on how much they had down there, if we had enough for a boat load we would go, but if we did not, sometimes we would have to wait until we did get a load.

Q. Who paid to have this material hauled, such as was hauled?

A. You mean the stuff that was hauled up for the railroad?

Q. No, sir, the merchandise to Glen Lyn. You mentioned that you hauled merchandise and fertilizer, and tobacco from Glen Lyn, that you received it at Glen Lyn, or did you also receive that below the falls?

A. No, sir; the tobacco we received up there, it was right at the mouth of East River.

Q. You mean the tobacco was grown there?

A. No, sir; it was grown out in the country and brought there and loaded on the boat there and we took it to Hinton, and
408 the railroad company paid us our freight back.

Q. The railroad company paid you for taking it down to Hinton?

A. Yes, sir.

Q. On how many of those trips from Glen Lyn, that is, up the river, or rather up there on the East River, to Hinton, for the railroad, did you actually make yourself, I mean, yourself?

A. I couldn't tell you that, because I don't know, but I made several trips, I couldn't say how many.

Q. Do you think as many as ten?

A. I guess maybe more.

Q. Can you recall who, on behalf of the railroad company, employed you to do that work? Can you name the man?

A. The man that had that contract was named Rhinehart.

Q. He worked for the railroad company, that is, he was employed by the railroad company?

A. No, sir; he had that contract to build the railroad, or that part of the Norfolk & Western in there.

Q. You mean that Mr. Rhinehart paid you for hauling tobacco?

A. No, sir; he didn't pay us for hauling tobacco or anything like that.

Q. Who paid you for hauling the tobacco down to Hinton?

A. The railroad company, the C. & O. paid us for hauling that tobacco.

The man who actually paid us for the hauling of tobacco to Hinton was the agent there at Hinton. I think it was Mr. Calloway, and I think Mr. Gunther—Mr. Flannagan and Mr. Gunther. We hauled tobacco there for several years.

I was sixteen or seventeen or eighteen years old or along there when we hauled that stuff for the railroad. After that we boated lots of stuff all along down below there, staves and lumber. We took a load of fertilizer down the river in the spring. I couldn't say where it had been hauled from or how it got to Glen Lyn from Dublin, but it was loaded on the boats there. I understood that it came from Dublin. It didn't come down the river—it was conveyed. I don't know whether the Norfolk & Western was running at that time or not. I couldn't say. If it was not running, it was hauled in there by wagon. We never hauled any fer-
409 tilizer but one year. We hauled a load one spring. I can't recall how old I was when we hauled that fertilizer down there. I must have been sixteen or seventeen years old—maybe eighteen. I won't say for certain.

Q. Now the supplies as I understood you boated for the purpose of building the Norfolk & Western railroad to Glen Lyn, on some of which occasions you had to unload the boat at the foot of Shumate's Falls, that also was the time when you were about the same age, wasn't it, sixteen or seventeen or eighteen?

A. Right along there sometime.

Q. That is, while the railroad was in the course of construction at Glen Lyn?

A. Yes, sir.

Q. That is the trip that you made in which you brought the fertilizer down there in the spring. Was that load of fertilizer brought down the river from Glen Lyn before or after you moved to the Salt Works?

A. That was before we moved to the Salt Works.

Boating on the river wasn't no easy job. If I was supposed to be out there today, I think I would let somebody else take my place. I don't know that it is as difficult work as I ever did—I have done some pretty heavy work; for example, making excavations for buildings is more difficult. Whenever you get an excavation for a building and go down in the ground, you don't get a breath of air. You do get some air on the river. There was always a breeze.

There was a ford across the river in my section of the river. I have forded the river many times and waded it too. I have forded the river just above Shanklin's Ferry and also at what they call Walker's Island. Those were the only two places that I forded the river. I waded the river also just above Shanklin's

Ferry on that ford. There is three or four fords down the river. There is one called Warford's Ford, but I never had occasion to cross that one. I went to Hinton many times on horseback.

Q. Did people in the country go by wagon or buggy?

A. Not then, or not often. You wouldn't see a wagon or buggy go by there I would say once or twice a year.

Q. Did the best road to Hinton run past where you lived?

A. No, sir; I don't reckon it was. There was a road that
410 ran down the river, but it wasn't no feather bed, I can tell you that.

Q. Why did you quit this boating?

A. I think the last trip I made down the river was in 1905 or 1906.

Q. The question I asked you was, why did you quit it?

A. I married and got away from the river.

Q. Do you know when the boating down in that country stopped?

A. No, sir; I don't know, I couldn't say. After I got away from the river, I never tried to keep up with it.

Q. Nor do you know why it stopped?

A. After they got to building good roads in there, then they could get their stuff cheaper than they could bring it up on the boats.

Q. The railroads were not the cause of it being stopped?

A. No, sir.

Q. Do you remember what your father's bateaux would draw, that is, what depth or the draft of the bateaux was?

A. It just depends on how it was loaded.

Q. When it was loaded, there was a draft of what?

A. From 12 to 14 inches.

Q. And it would carry how much of a load?

A. We would always aim to bring about 5,000 pounds up the river.

The contractor who had the contract for building the Norfolk & Western road was named Rhinehart—something like that. I don't know his given name—we always called him Captain Rhinehart. I think he lived in Roanoke at that time, but I am not certain.

The place in Virginia at which we lived was close to Glen Lyn—it was about two miles northwest of Glen Lyn on a farm. A man named Louis Caperton lived on the adjoining farm. This was south of my father's farm, between us and East River. There also was a man named Thompson who had a piece in there between us and East River where Shumate had his store. Charles S. Thompson owned the farm on the other side of us.

We lived next to him. Our farm was about seven or eight miles from Round Bottom. I have ridden horseback from my father's place to Round Bottom around the mountain.

Q. When you hauled tobacco for the railroad, isn't it a fact that on a good many occasions the tobacco was hauled by
411 wagon to the foot of Shumate's Falls, and there was loaded on your bateau?

A. It was not; no, sir.

Q. That never was the case?

A. No, sir.

Q. Wasn't that load of fertilizer that you mentioned hauled by wagons to the foot of Shumate's Falls and there loaded on your bateau?

A. No, sir.

Q. When you went up the river from Mercer's Salt Works, what is the first falls that you come to?

A. After leaving Mercer's Salt Works?

Q. Going up the river; yes, sir.

A. There were some falls right in there.

Q. Did you put your boat in the river before or below those falls?

A. Below it; we were in there just below the falls. Mercer's Salt Works were near these small falls there.

Q. There were small falls there?

A. Yes, sir.

Q. What were the next falls that you struck?

A. The next place up there was Shanklin's Gravel.

Q. Shanklin Gravel was the next?

A. Yes, sir.

Q. What did you next strike?

A. There were two or three little chutes there; I don't know; they didn't have no name until they got to Wiley's Falls.

Q. I wish you would tell us if you had and difficu*l*ty in going over these falls?

A. No, sir; not a bit in the world.

Q. When you got to Wiley's Falls, did you have any difficulty there?

A. No, sir.

Q. You had no difficulty there?

A. No, sir; there was no trouble going up the river to Glen Lyn nowhere.

Q. How did you get through Wiley's Falls?

A. How did we get through Wiley's Falls?

Q. Yes?

412 A. We just shoved the boat through there.

Q. Do you remember what part of the falls you shoved the boat through?

A. Well, it was on the east side of the falls.
Q. On the east side of the falls?
A. Yes, sir.
Q. What is there on the east side of the falls; is there a chute there to go through?
A. There is a chute there now, but when I first went through there, there was no chute. Them falls tapered off there.
Q. You went through on the east side, did you?
A. Yes, sir.
Q. Before the work was done there and after it was done by the Government, there was a straight chute through the east side of the falls?
A. Of course, there was a chute there, but before that there was not, but the falls tapered off to that side where there was not so much falls to it.
Q. Did you go through there before the Government did this work?
A. Yes, sir.
Q. Where did you go through then?
A. Glen Lyn.
Q. On the east side of the falls?
A. Yes, sir.
Q. What was the next falls above Wiley's Falls—the next obstruction above Wiley's Falls?
A. There was another little falls up there; I don't know what they called them.
Q. How far above Wiley's Falls?
A. About, I will say, about 2 or 2½ miles.
Q. Did you have any difficulty there?
A. No, sir.
Q. What was the next beyond that?
A. Then comes Shumate's Falls.
Q. Did you have any difficulty at Shumate's Falls?
A. Sometimes we would and sometimes we did not.
413 Q. When you went through Shumate's Falls, where did you go through?
A. We would go through on the left-hand side as you went up the river.
That would be on the right-hand side if you were in the river, but on the left-hand side if you were on the bank. If you were in the river, the boat would be on the right side, but in walking up the bank, it would be on the left-hand side of the river going up. I could not tell you whether that would be the east or the west bank of the river because the river makes so many turns.
Q. Was there a channel through that part of the river just above Shumate's Falls or through Shumate's Falls?

A. No, there was no channel cut through there; no, sir; Wiley's Falls was as far as they did that.

Q. How much tide did you have to have in the river to get through Shumate's Falls?

A. You did not have to have much of a tide; just so the water was good and swift, you could go through there.

Q. How much tide did you have to have to go through Wiley's Falls?

A. You didn't have to have any; just ordinary water.

Q. Before the channel was built, did you have to have any tide to go through Wiley's Falls?

A. No, sir.

Going up the river, we could run a little better when the water was low than when we had a tide.

I don't know how high Wiley's Falls was, but my best judgment is that it was higher on the west than on the east side. I could not tell you its height in inches on the east side. Regarding the elevation of the river, it is stationary. I could not tell you the elevation in inches in low water. I would say that it was as much as a foot and more. I know there were more than five or six inches there. I could not tell you whether it was less than eighteen inches. I think there was a difference of six or eight feet in elevation between the higher parts of Shumate's Falls at low water and the lowest part after the water had passed over the falls. Them falls was pretty long in there.

414 The witness, on Redirect Examination, testified as follows:

I testified that we aimed to have cargoes or loads of 5,000 pounds. When we went to Glen Lyn we would have loads of approximately 5,000 pounds. I said about two-thirds of the time we had to unload at Shumate's Falls. We did not take the unloaded cargo around the falls. They came with wagons and teams and hauled it. Shumate's Falls was in the State of Virginia. We did not have to unload at Shumate's Falls when we came down the river from East River. We did not have to unload at Shumate's Falls. I never unloaded a load anywhere on the river while I was on the boat.

I guess I was a couple of hundred yards away out on the bank when I saw the boat Cecelia. I don't know for certain what it carried. I know it carried passengers. I seen them on there, but as to merchandise or freight, I could not say because I did not see it. It was a matter of general discussion about the boat going up and down the river and what it was hauling. They made several trips coming up below us there at Crump's Bottom. I don't know what he had, but it was passing us.

Q. You were asked about trips up the river to Glen Lyn. State whether or not you could make those in the summer, the springtime, and the fall?

A. Yes, sir.

Q. Could you make them in the wintertime?

A. Well, if there was no ice on the river, we could.

Q. And at a time when there was no ice on the river——

Q. How many years did you boat to Glen Lyn and back again?

A. About 3 years, to the best of my knowledge.

Q. And you made those trips whenever you had a cargo?

A. Yes, sir.

Q. And when you made them, you said you went regardless of the weather and conditions?

A. Yes, sir.

Q. And you were never stopped on any one of those trips?

A. No, sir.

415 We never stopped on any of those trips. I said the work of pushing one of those boats was not as difficult as excavating for a building; I'll take my work on the boat all the time. The boat work was easier.

By "fording" the river, I mean going across on horseback. You could not go across on horseback in high water or when the river was fairly high. It had to be low water. In low water the water would come up so high on the horse that you would have to draw up your legs. It would come above the stirrups a right smart piece on the horse's side. You could wade the river when the river was low, but not in high water or medium water. In low water the water would come up almost under my arms sometimes in wading the river.

I would say that Wiley's Falls was fifty yards long downstream. I guess Shumate's Falls is about 200 yards long—maybe longer than that.

I carried fertilizer down there from Glen Lyn for only one season. I do not know whether or not my men carried it more than one season.

Our farm was located right close to New River. That was what we called the second bottom from the river. Our farm was about half in Virginia and half in West Virginia. The line split right through it. We had 640 acres. We raised tobacco and shipped it down the river on bateaux. We put it on the boats right below the mouth of East River at a place called Baptizing Hole. That is in the State of Virginia. Wiley's Falls is located away down the river, six or eight miles from there, partly in Virginia and partly in West Virginia. The State line crosses at that falls.

The witness on Recross Examination testified as follows:

Q. This tobacco that you raised—why did you send it down the river?

A. If we could not send it down the river, we would have to haul it to Dublin.

Q. Why did you want it to go to Dublin?

A. To get it to the railroad.

Q. Was that the same object you had in mind in sending it to Hinton? To get to the Railroad?

A. Yes, sir; to get to the railroad.

I was only ten or twelve years old when we were shipping tobacco at Glen Lyn. The fertilizer which I hauled for one season consisted of only one load—one trip up there.

416

Q. Now, Mr. Peters, to clear up one further thing—how old did you say you were when you worked on the channel—the Government channel?

A. I could not tell you.

Q. You might state it approximately; you said you did a man's work. Approximately how old were you?

A. I could not give you the dates.

Q. I don't want the date; I want your best recollection of how old you were then?

A. I was 17 or 18 years old.

Q. Was it after that that you hauled these supplies for the building of the Norfolk and Western Railroad to Glen Lyn?

A. No.

Q. Was it after the channel was built?

A No, sir; we hauled a whole lot before the channel was ever built.

Q. What did you say?

A. We hauled a whole lot before the channel was ever built; then we hauled while the channel was abuilding.

Q. You hauled some before the channel was built?

A. I don't recall whether or not it was for the Norfolk and Western Railroad.

Q. That is what I was asking you about.

A. We hauled some for John T. Shumate, that run a store there.

Q. Let's get back to the supplies that you mentioned that were hauled during the course of the construction of the Norfolk and Western Railway Company. Now were those supplies hauled after the channel was built?

A. I cannot recall that; I don't know that.

Q. You don't know whether they were hauled before or after the channel was built?

A. No, sir.

Q. That is your best judgment, is it?

A. As well as I remember.

Q. Do you remember if you went through Wiley's Falls or not?

A. Yes, sir; we went through Wiley's Falls.

417 Q. And you went through Shumate's Falls sometimes without unloading?

A. Yes, sir; we went through Shumate's Falls without unloading; we went clear on up into East River.

Q. Was the channel cut through Wiley's Falls when you did the boating of the supplies for the construction of the Norfolk and Western Railroad?

A. I cannot recall whether or not it was. I cannot say.

JAMES H. HOWARD, on Direct Examination testified as follows:

I will be sixty-seven the 12th of next January. I was born January 12, 1870. I live in Pulaski County, Hiawassa District, about a mile from New River. I have lived there thirty-eight years. Before that I lived a mile above Allisonia right on the river. I have lived on or near New River my entire life. I am familiar with the New River in the vicinity of Allisonia down as far as Radford.

During my lifetime I have seen keel-bottom boats on New River. They were about 65 or 70 feet long, about 8 feet wide and they used two by sixes and sloped them two by sixes to make it rounded then under the bottom, and that was planked up the long way and on the inside they put two by eights across and laid a sub-floor in order to put everything they wanted to hold on, and then up about six inches above the sub-floor there was a running board eight inches wide from one end to the other for them fellows to walk on that run the boat. Those boats loaded were supposed to carry five tons.

I saw those boats loaded. My father used to haul pig iron from Boone Furnace to Allisonia and he brought that on boats and taken it to New River Depot which is below Radford. I don't know exactly how far it is below Radford. The distance from Boone Furnace to New River Depot, I suppose, is twenty-eight or twenty-nine miles.

The first time I observed these boats on the river was when I was eleven years old. They was cutting a channel in the river—a boat sluice. My father owned a ferry and they put a camp in his bottom, right at the ferry. That was a mile above Allisonia. When they opened the channel up that far those boats come up that far. The ferry my father owned was called Howard's Ferry. Those boats were running there when the railroad was built.

418 They was using them boats there. There was a rock quarry on my father's place. The stones were gotten out from it

for the bridge for the railroad at Hiawassa and also Reed Island and those rocks were hauled to the river and loaded on the boats and taken four miles to Hiawassa for those piers. They claimed that the capacity of those boats which hauled the stone was ten tons. I couldn't tell you. There were four of them hauling pig iron and two hauling stone I think.

I am not positive how long these boats were used in this way, but I think the furnace—those boats we used them up to the time they quit to haul pig iron—as long as the furnace run. My judgment is that it has been thirty-five or forty years since Boone Furnace run. I suppose it was twelve or fifteen years between the time the furnace stopped and I first saw these boats. They stopped hauling iron at the time the furnace stopped. I don't think the furnace had been stopped more than 18 months or two years when the railroad was built. This traffic I am speaking about occurred before the railroad was built.

Speaking about roads, there was a travel-way from there but it was pretty rough. My father hauled pig iron by road to Pulaski, which was then called Martinstank. It was three miles from Boone Furnace to my father's place and about twelve miles from there to Pulaski or Martinstank. This hauling by wagon was done usually along about the last of November. It would get cold and there would be too much mushy ice in the water so that you couldn't use those boats. The winters were different then from what they are now and you couldn't use the boats then.

My father would haul with wagons then until along in March when they would begin using the boats. The only time I hauled on wagons was when the river was full of mushy ice.

They gave my father $4.00 a ton to haul that iron to Martinstown or Martinstank, and four of the fellows who worked on the boat used to work for my father. I was a kid then and used to ride on the boats some with them. They told me that they were getting $1.50 a day and it took them a day and a half to make the trip and they would take five tons. That was $9.00. When my father hauled it on the wagons, that was $20.00. There was a difference there of $9.00 and $20.00. It was more profitable to haul on the river than it was to haul by wagon.

My father ran Howard's Ferry. I recall the time when that ferry boat broke loose. It was fifty-two feet long and
419 twelve feet wide—a flat boat. The last few years it was operated, it was rented to Virginia Iron Coal & Coke Company. They paid my father and mother $1.00 a day for it. They put a man there to mind the ferry and he let the boat get away on a tide and it washed down to where I am living now, about twelve miles. A man by the name of Whit caught the

boat and I said to my brother, "Let us take that boat back up there." So we hired a man to help us and Whit wouldn't let us have the boat unless we paid him $10.00 for capturing it. We paid him $10.00 and taken the boat back. It taken us three right at two days. We took the boat back twelve miles to Howard's Ferry, the original place.

The witness on Cross Examination testified as follows:

The other man on the ferry boat with me was my brother, R. L. Howard. I don't remember the third one at this time. They just picked up some of the hands they had at the mines and put them there. There was no special plan. One man would be put on one day and maybe another one the next. Three of us taken the boat back when it washed away—my brother and I and a boy named Dallas Elkins. It was Bob Whit that caught the boat. We brought the boat up just in the daytime. Nobody else was helping with it, I am sure. We taken the boat the first day and fastened it to the bank and went home that night and went back the next morning. We used poles to get it up.

There was two falls that we had to go next to the bank on account of we used a cable over two falls. We couldn't stay in this boat and use the cable because we had to snub it to a tree above. We did not use a block and tackle to get up the river with the boat. We used a windlass which we made and a wire cable to go over those two falls. Outside of that, we didn't use anything but the pole. One of those falls was, I suppose, a mile above Whit's Ferry. The other falls was up at what they call Runyon's Island, which is right where the bridge is built now across New River below Hiawassa. I do not mean the railroad bridge. We have a bridge across for cars and everything at Lowman's Ferry. That is below Hiawassa. There is a railroad bridge at Hiawassa.

Mr. R. L. Howard who testified in this case the other day is my brother. I do not know that my father hauled any iron to Pulaski while iron was being boated on the river, but I wouldn't say he didn't, but not that I know of or have any recollection of. He did haul iron in the winter time. I know that. I don't mean to say that he didn't haul it in the summer time.

Regarding your question whether my father had a contract with Boone Furnace people that whenever he was hauling a load of iron to Pulaski and came across the boats loading at the wharf he would get a dollar for going ahead and unloading on to the boats. I don't know about that. I was just a kid. The men got a dollar and a half a day working on these boats. That is what they told me. There were four of those men that worked on the

boats that used to work for my father. There were three on each boat, but there were four of these who used to work for my father.

The witness on Redirect Examination testified as follows:

I spoke about having a windlass to help get this ferry boat back upstream. I will explain why it was necessary to have the windlass. There were twelve feet of water there that we were trying to push the boat against and it made so much force on the boat in those swift falls that we couldn't push it over is why we used the windlass. Three men couldn't push it over there because there were twelve feet of flat space in the breast of that water. That is why we couldn't push it over there.

The contract which my father had was for hauling iron from the furnace down to the landing. It was not a contract to haul down the river.

The witness on Recross Examination testified as follows:

My father had a contract with Graham and Robertson to haul the iron that was put on those boats on the river. I don't know anything about a contract to haul to Martinstank. I don't know whether he had such a contract. He would haul to Martinstank and got $4.00 a ton for it. I don't know anything about him having a contract to haul to Martinstank. He had a contract to haul to what is called Allisonia now on the boats. We had a whole lot of teams there and could cultivate our crops and spare a team off nearly all the time. It was no trouble to take a team that distance. We would haul five or six tons a day.

He made this contract with Graham and Robertson's superintendent, who was Major Rives Tipton. My opinion is Mr. Wesley Lyons was superintendent there at that time. I wouldn't be positive about that. I didn't say that he had a contract to haul it to the river, but didn't have a contract to haul to Martinstank

421 because he had had a contract that what they didn't boat to Martinstank he would have to hire teams instead of using what teams we got because he could not have kept it away from the furnace. That was fifteen miles that he had to haul it. Certainly he would be utilizing the team all the time, but we had our teams to farm with. We had six hundred acres of land. We didn't have the teams especially to haul. We had a good many teams. I do not mean to say that all of these teams were busy all of the time.

Q. You could just as well be hauling to Martin's Tank as to the river, could you not?

A. I suppose so. I don't know what difference it would mean.

Q. And you know your father got $4?

A. I can tell you the difference very easy. That is very easy to explain. We got a dollar a ton for delivering it three miles from the furnace to Allisonia. We only got $4 a ton for deliver-

ing it from the furnace to Martin's Tank. That was fifteen miles. He would send the teams to Boone's Furnace, put on a ton of iron, bring it three miles to home in the evening and the next morning make the trip to Pulaski, to Martin's Tank and back, twelve miles. He got $4 for that. He put men there time and again, and they would haul six tons this three miles. That was $6. There was a difference there of $2 a day for a team, and that was a great big difference. They didn't do that every day, but they never did haul less than five loads.

Q. Isn't one of the main items of hauling iron loading and unloading?

A. Well, of course, that was a great big job, but we just paid those men 75 cents a day that we had on the place there and it was a hardship on them, of course, but it really wasn't nothing more out of our pocket.

I did not say that my father did not haul iron to Pulaski while they were boating iron on the river. I said that we would haul iron there when the mush ice was in the river and they couldn't use the boats. Along in November, the nights would get cold and get mush ice in the river and they had to cut the boat out. He did haul then, I know. He might have hauled some little to Pulaski when there wasn't mush ice in the river. When our crops was laid by, the teams was idle then, and of course it didn't take them all to keep the iron, what they boated at Allisonia, that short distance. They might have hauled some.

422 I wouldn't say that he did or didn't. He had no contract to haul to Pulaski, but he had a contract with their superintendent to put iron at the boat at Allisonia, a distance of three miles. That was the only contract he had. Mr. R. L. Howard, who testified in this case, is my brother, six years older than I am.

HENRY S. SKEEN on Direct Examination testified as follows:

I was born in 1848 at Walker's Creek, Giles County. I lived there until 1862 and moved then to New River down near a place called Lurich. The railroad pushers used to stay there. That place is below the Narrows about four miles, between Narrows and Glen Lyn.

I served in the army in the Civil War in the 36th Virginia Regiment. While I was in the army, I have camped on New River down at the Narrows and at that time saw boats operating on New River. They run from the Narrows up this way about Radford, I suppose. The army had a commissary down there at the Narrows right about where the station is now and those boats would bring provisions down there to the commissary, stuff like that you know for the soldiers. Some of the boats would go downstream from the Narrows where I was camping—right on down below Glen Lyn—I don't know how far down they went.

After the War was over, I stayed in the neighborhood. After the war, I did not see very many boats on the river. I saw one that hauled bales of straw and hay or something of that kind from up above here down to Lurich. It come from up this way somewhere and went downstream to Lurich.

The boats they used during the Civil War were called bateaux, keel bottom boats, and were about eight feet broad and about three feet or something like that, and maybe forty, fifty, or sixty feet long. I don't know.

I did not travel on any of the boats on New River very much. I came up from Glen Lyn one time on an almost empty boat coming up to the Narrows. I never went up above the Narrows. We had no trouble making that trip.

I have heard of a man named Mr. Pedigrew. He was a railroad contractor, grade contractor—I don't know whether he was a subcontractor or not. He had a contract for part of the Norfolk and Western Railroad. The camp was down at Lurich. I know only where he got part of his supplies. Part came out from about the C. & O., about Lowell. He brought some
423 stuff from up the river here. I don't know where he got it—about Radford, I suppose. He brought that down to Lurich on the river. I don't know how many boats he had carrying stuff down for him. I didn't see more than one boat at a time. I am not sure that that boat made more than one trip. I never seen him make but two trips. I didn't see any other trips made then. Way back further than that, I saw a good many—about the time the Civil War was going on. There was right smart hauling on the river then, moving the stuff first one place and then another. There wasn't very many after they got this railroad built down this river. That about cut the boat business out.

I don't know exactly how many men they carried on these boats as crew—seven or eight, possibly. They would pull the boats up with poles. They had three men on each side and the man in the hind end of the boat had a steering oar to guide it when they were going up the river. When they was coming down, they had one man on the side with an oar and one in the hind end to steer the boat.

Q. What would they do with their poles?

A. When they was poling the boat?

Q. Yes.

A. They would put it down in the bottom of the river, a great long pole with an iron tap on the end of it and they would put the other end against their shoulder up here and had a pad tied on here and come out about like this and put that pole against that and they would put the pole down and they would walk up

to the front of the boat and they would start and while they was going down this side the other men was going up that side, you see, and kept the thing going all the time.

Q. When you saw the boats on the river, did you ever see any of them have any difficulty getting up and down?

A. No, sir; never where I was.

I also saw timber moved on the river—poplar logs and walnut logs, a lot of sawed timber and cross ties and framing for a bridge and trestles and something like that for the railroad company. They were putting in a bridge down below Lurich between Lurich and Glen Lyn. They put the timber in a raft which was pretty good size. I know where that timber came from—from up there just below the Narrows, and I believe what is
424 called Cold Spring Branch. They took it out down below Lurich.

When they were carrying ties during the Civil War, they brought them down this way. They didn't get none down that way to take that way. They couldn't get nothing down there to take nobody or haul nowhere. There were hardly any roads at all around our neighborhood. They would haul a two-horse load on the road and put about four on it.

They didn't take much farm produce out. Sometimes they shipped tobacco and stuff down the river. I guess it went to about Hinton. There was a tobacco factory down there somewhere.

The witness testified on Cross Examination as follows:

At one time there was a tobacco factory at the Narrows. I believe it belonged to Whitlow and Merrill, men from Lynchburg. I heard of a man named Mike Clark. He was one of them. There was another man whose name I have forgotten. Clark died at Wolf Creek.

Q. Mr. Skeen, I don't understand you as saying that tobacco was shipped from the Narrows to Hinton, do I?

A. No, sir; I say it went down towards Hinton. There was a man down there below there somewhere between Hinton and Glen Lyn that bought tobacco and overhauled it and then shipped it on somewhere else.

Q. What was the name of that man?

A. A man by the name of Shumate that had a warehouse down there.

I was in the 36th Virginia Infantry in the Confederate Army. I joined the army about '64 sometime. I went the time when they took them at sixteen years old—16 to 60.

John Pedigrew was contractor to build the grade of the Norfolk and Western Railroad between Narrows and some point somewhere about Glen Lyn. I don't know how far out toward

West Virginia he went. I actually hauled some of the stuff from Lowell for him—machinery and stuff he brough' there that way. Lowell is in West Virginia on the Greenbrier. The C. & O. Railroad comes there. I believe some of the other farmers in the neighborhood engaged in that hauling.

In answer to question whether I know the Spanglers and Dunns hauled a great deal, I didn't live over at Peterstown. I saw them on the road while hauling or working for Mr. Pedigrew. I hauled over that road for Mr. Pedigrew. While I was engaged in that hauling, the Dunns and Spanglers from Monroe County were engaged in hauling some-
425 thing. The Dunns and Spanglers had a big livery business at Peterstown. They ran a stage line and hauled people from Lurich to Red Sulphur Springs and Lowell. I don't remember just how long. I don't know when the stage line started, but they used to run other stage lines before that It had been established a long time.

The hauling I did for Mr. Pedigrew and the business of the Spanglers and Dunns which I just mentioned was hauling with wagons and teams on the road. The stage route I am telling about crossed the river at the ferry below the Narrows—Hobb's Ferry. Anthony Adair had a ferry down at Lurich, but it didn't amount to much. There was a ford at Lurich they used at times.

The railroad bridge I was talking about was the Norfolk and Western Railroad bridge across the big hollow above Glen Lyn. We rafted or floated crossties and stringers down the river for that bridge. They built the bridge of wood. We floated sawed lumber, stringer. We didn't build any cofferdams for that place. It was a big hollow and a branch ran down through it.

I have seen logs come down from Ripplemead. I never said this particular work, I said I had helped to bring down some logs.

These Johnsons had that other I think brought down from up there for that bridge at Wolf Creek at Narrows. Johnsons come up the river and got some pine and lumber and floated it down the river and took it out and sawed it at the Narrows.

The witness on redirect-examination testified as follows:

I don't know whether the Dunns and Spanglers operated the stage in bad weather. Sometimes they had to go through pretty bad weather and sometimes they would have about six horses for a four horse load to get it over when the roads were wet. They didn't have much roads then.

WILLIAM PRICE (Colored) on direct examination testified as follows:

I was born in Shellsville, Montgomery County, close to New River. I have lived in Montgomery County all my life close to Tom's Creek with a man named Peter M. Price.

I remember seeing boats on New River passing along close to where I lived, which was within a mile and a half of New River.

I would go along the cliff and look at it, the boats passing
426 up and down the river. I was seven or eight years old or so when I first saw boats there. I will be seventy-six the 18th of April.

Q. Did you ever see any of these boats close up to them?

A. Yes, sir; I have been along the river bank while the boats passed up and down the river.

Q. Ever ride on any of them?

A. Rode on them sometimes.

Q. When you rode on them where would you start from?

A. Start from New River bridge, Central Depot.

Q. And where would you go to?

A. I would ride down the river to Cowan's Mill at the mouth of Tom's Creek.

Q. Do you know how many times you did that?

A. I don't know exactly, some six or seven times and maybe more.

Q. Did the boatmen have any trouble going up and down the river when you were on the boats?

A. No, sir.

Q. Ever get stuck on any of the Falls?

A. Got stuck lower down the river, McCoy Falls, a great big falls; they would get stuck there sometimes and hang a whole day, but I didn't go that far down.

Q. Ever go up the river?

A. Went up from Cowan's Mill, to Central Depot—from Central Depot down to Cowan's Mill at the mouth of Tom's Creek.

Q. Did they have a load on when the boat went up?

A. Didn't never have much of a load up there.

Q. Did they have a load on when they went down?

A. Yes, sir; have a load when they went down, but not much when they went up.

Q. Do you know what they hauled on these boats?

A. They hauled coal and corn, wheat and crated chickens, and hogs and produce of all sorts, and took that down the river.

Q. And you never went on the boats that went down the river?

A. No further than Cowan's Mill.

427 Q. Did Mr. Price give you permission to go up the river?

A. Yes, he let me go along with him up the river, and then come down and sent me on home from Cowan's Mill, on back home. I stayed with him.

Q. Would he ever let you go down the river?

A. No further than Cowan's Mill.

Q. Why wouldn't he let you go any farther?

A. Thought I would get too far from home, and have to walk.

Q. Do you know where the boats went to down the river?

A. I know where they said they went, said they went to Hinton. I never went that far down but a man working on them said that was where they went with things, down to Hinton, but I never went that far down.

By Mr. Abbot. We move to strike that out as hearsay.

Q. Did they ever mine any coal at Price's Mountain and Brush Mountain, that you know of?

A. That is where the coal that went down, where they hauled it, from Price's Mountain and Brush Mountain, and loaded it down there on the boats that went down the river.

Q. Do you know how much those boats would carry, how many wagon loads?

A. I don't know exactly, but they would haul the coal with a four-horse team with wagons and fifty bushel to a load, and sometimes four loads on a boat and sometimes put five.

They built railroad tunnels around the section I worked on on the Pulaski side at Belspring. I never saw them bring any supplies on the river down to those tunnels when they were building them. I worked on two or three other tunnels on the Pulaski side.

The witness on Cross-Examination testified as follows:

Q. Uncle William, who told you they put four or five four-horse wagon loads of coal on those boats?

A. They put about four loads on a boat with those big wagons.

Q. Who told you that?

A. I don't know the man who owned the land. I guess they dug it and hauled it to the boat.

Q. I said who told you that they put four or five four-horse wagon loads of coal on the boat. Who told you that first?

A. I seen that.

428 Q. You have seen that?

A. Yes, sir; I have seen them haul coal, four-horse loads and two-horse loads and put them at a place on the river bank and they would load it on the boat.

Q. They would put the coal on the river bank and then load it on the boat?

A. Yes, sir.

Q. Who hauled that coal to the river bank?

A. Different ones, I don't know who it was.

Q. Just where on the bank was the coal unloaded?

A. Some was unloaded at Cowart's Mill and some down at McCoys, some was unloaded there where they could get it to the boat and put it on the boat.

Q. Do you mean to say the coal was gotten out of that hill above Cowan's Mill, up above Tom's Creek? They didn't get any coal up there, did they?

A. From Cowan's Mill, the whole mountain back there was full of coal. That is all they had to live on, the coal they got out of Brushy Mountain; they hauled it down to the river below; that is where they got the coal.

Q. They hauled it down the river below Tom's Run?

A. Yes, sir; and they put it on the boat at Cowan's Mill.

Q. At Cowan's Siding?

A. At Cowan's Mill, it wasn't at the siding, the siding was at Belspring.

Q. You were talking about Cowan's Mill and not Cowan's Run?

A. Yes, sir.

I saw them haul coal to the river bank there. I know the men got the coal, but I don't know who they were. I don't know their names. I was too far off to find out their names. I would see them working but didn't find out who they were. I was right young and didn't think it was none of my business to ask them who they were. Price's Mountain is back of Price's Fork between there and Christiansburg. I saw boatloads of coal loaded at Cowan's Mill, but none of it that I ever saw came from above Cowan's Mill.

Q. Did you ever see any corn being hauled down past Cowan's Mill on those boats?

429 A. Yes, sir; corn, wheat, and all kinds of produce. The men who had stores at Prices Fork would take the produce down the river.

Q. Did you ever go to French's Mill?

A. You mean Price's Mill?

Q. No; French's Mill. Did you ever hear of it?

A. No, sir.

Q. You never went down there?

A. No, sir.

Q. Did any of that corn or wheat ever come to Cowan's Mill?

A. At Cowan's Mill they used to grind some there, some meal and corn there, and put it on the boat and take it on down the river.

Q. Then this was meal and flour going down the river, rather than corn and wheat?

A. Yes, sir; they shipped corn and they shipped wheat and then had the flour ground and the meal ground and shipped it down the river at Cowan's Mill. It wasn't Cowan's then, it was old man Jim Kent's Mill.

Q. Do you remember Major Kent?

A. I ought to, he cracked me over the head with a stick many a time.

Q. He didn't hit you hard enough, did he?

A. Sir?

He had a ferry boat across the river.

Q. Who were the people that operated the boat that you rode on?

A. Mr. Price, he was one, he was the Captain on one boat and there was five men on the boat, and only one Captain on the boat.

Q. They called him the head man?

A. Yes, sir; I knowed him, and I knowed three colored men from down east that were on there.

Q. Who were they?

A. One was Frank Bannister, and old Man Jim East and Lewis Farrier.

Q. And they were the ones that were on Mr. Price's boat?

A. Yes, sir; and then there was a lot of others on the other boat and some of them I didn't know.

Q. Do you remember a place in the river on about Cowan's Mill called Barnett's Falls?

A. Yes, sir; that is way up the river.

430 Q. You have been through there?

A. I never rode through that but once. I went through that coming down from up at Radford once.

Q. You say you came through there once?

A. Yes, sir; through Barnett's Falls. That is what you are talking about, ain't it?

Q. Yes.

A. Yes; I came through there once. I got on the boat at Barnett's Falls several times and came on down to Cowan's Mill, to the mouth of Tom's Creek.

Q. Do you mean that you would get off the boat above the falls?

A. Below the falls and would come on down to Cowan's Mill. I didn't get on the boat above the falls, but I got on below.

Q. You always got on the boat below Barnett's Falls?

A. Yes, sir.

Q. You never came down from Radford or Central?

A. Only once down to Barnett's Falls. I was afeared to come, I was afeared of the water.

I remember the Wing Dams up there that formed a sluice through Barnett's Falls. I remember the timber and the cribbing that were put in to keep the water in the sluice. I don't know who built it, but it was built there before 1874 or before I was seven or eight years old. There was the channel for the boats to go through. I would sit up on a high cliff and look at the men working in the river when I was about seven or eight years old. I remember when the men were mustered out and when the man

with whom I lived went to the war. I taken him near to Christiansburg on a horse and he turned me back as he was afraid I wouldn't know the way home and I went back home. It was before that time I saw these people working in the river.

Q. Who told you that you were born in 1866?

A. That is the way I have my name down.

Q. Who told you that you were 76 years old?

A. That is the way my age was put down.

Q. Put down on what?

A. On a paper.

431 Q. What paper?

A. It was put down by Squire Perfeder.

Q. When was it that he put your name down?

A. When I was quite small. When I was bound out to this man, I told you about, they took my age then when I was bound out, until I was twenty-one. Old man Perfeder took my age, but whether he put it down right, I can't say.

Q. You remember the Civil War and the men working in the river at that time?

A. I remember when they were mustered out. I had two Uncles that worked in there and I know that they were drowned.

Q. Were they the Myers?

A. Yes, sir.

Q. Was anybody else drowned when they were?

A. I had two Uncles and there was a white man by the name of Dotson that got drowned.

Q. Where were they drowned?

A. At the Big Falls.

Q. Where is that falls?

A. That is way down the river.

Q. Near the line between Giles and Pulaski County?

A. It is down to the line betwixt Montgomery and Giles.

Q. I mean Montgomery and Giles?

A. Yes, sir.

The witness on Redirect Examination testified as follows:

Q. Uncle William, I want to ask you a couple of questions. Do you remember seeing any soldiers during the Civil War?

A. Yes, sir.

Q. Did you ever see any soldiers marching?

A. Yes, sir; I have seen them marching.

Q. What makes you think you remember seeing soldiers marching?

By Mr. Abbot. We object to this evidence. What makes him think he has seen them, he is their witness.

By the Court. Do you say that you object?

By Mr. ABBOT. I think he is undertaking to discredit or impeach his own witness.

By Mr. GATCHELL. No; I am not trying to do that.

By the COURT. I want to know if you object.

By Mr. ABBOT. Yes; I object.

By the COURT. The objection is overruled.

By Mr. GATCHELL:

Q. What makes you recall soldiers marching, or what do you recall about seeing the soldiers marching.

A. I seen them stirring about, I seen them lots of times pass through where I lived.

Q. Was it before that time when you saw the soldiers pass or after that time when you saw the men working in the river?

432 A. It was before I seen the soldiers that I seen the men working in the river.

Q. Before you saw the soldiers you saw the men working there?

A. I saw the soldiers when the war was breaking up.

J. R. SMITH on Direct Examination testified as follows:

I am sixty-five years old. I have lived in Hinton close to forty years. Before I liver there I lived four miles from Hinton and after I liver at Hinton we moved to Cash's Hill or what is called Mercer's Salt Works. In all my life I haven't been over three miles away from the river.

I have worked on New River on a bateau, I have rafted logs, ties and lumber and have boated hay, staves and export lumber. I commenced working on the boats on the river when I was about thirteen years old, I was making a man's hand when I was that old and worked on there until I was about twenty-eight or twenty-nine years old or more.

I was about thirty years old when I quit running regular. After that I ran on a few trips. I never had any boats of my own. I worked for Squire Jim Peters, a merchant who ran a store at Mercer's Salt Works. He had a son we called Bud Peters, but some called him Henry Peters. The son was older than I am, but I don't know his age.

We ran these boats from Hinton to Mercer's Salt Works and we had other trips up to Round Bottom and then we had some extra trips up to Round Bottom and then trips above Round Bottom.

The highest I have ever been up the river on my trips was above Glen Lyn close to about the Narrows. We moved a man when we went to the Narrows and we went to Glen Lyn to get fertilizer and stuff. The man we moved to the Narrows was Mr. John Crockett, who was going from Crump's Bottom to Radford. We

loaded his stuff on the boat and taken the boat up the river. We had two boats. They were bateaux about five feet or so in the bottom and about eight feet at the top and seventy feet long. Squire Peters had two boats for a while. The old boat was laid out and then he had one built called the Blue Bird.

I did not go all the way to Radford with this boat. I went up there close to the Narrows. Then they loaded the stuff off one boat onto the other and three of us taken this other boat back to Glen Lyn and got a load there to carry back to the Salt Works.

433 G. In other words, you had two boats going up the river on that occasion?

A. Yes, sir; we divided the loads up on the two boats and then when we got up there we doubled over from one boat to another.

Q. You mean that you took the cargo of one boat and put it over on the other?

A. Yes, sir.

Q. Then you loaded up the empty boat and returned back downstream to Hinton?

A. Yes, sir.

Q. What became of the boat that was loaded?

A. It went on.

Q. It went on where?

A. I reckon it did. We went back after we unloaded, we cut out.

Q. Did you see the boat start out?

A. No, sir; because after we unloaded we cut out.

Q. You mean by "cutting out," that you returned?

A. Yes, sir; we started back on our other trip. What we call "cutting out," is when we leave the bank, we cut out.

Q. How many trips would you make up and down the river?

A. It is hard to tell how many we did make. Every spring we got fertilizer from the Virginia Line, on account we could take three times the load from up at the Narrows that we could bring from Hinton up that way.

Q. In other words, you could carry a bigger load coming from the Narrows down than you could going from Hinton upstream?

A. Yes, sir.

We went to Glen L,n for the fertilizer. We boated goods up there for Mr. John Shumate from Hinton up to East River or what they call Glen Lyn. These trips were not regular, but we took a trip sometimes in two or three months. I don't know where they ordered the fertilizer from, but it came to the depot of the Norfolk & Western at Glen Lyn and we went there and got it. We would run up in the East River where it branches

out and runs in to New River, would shove the boat up into East River and load it there and then back out. We would have
434 to back out because we couldn't turn around. We would come down the East River to the New River and then turn around.

Q. When you came down the river from Glen Lyn, did you have any trouble getting through?

A. No, sir.

Q. In going upstream what were the conditions?

A. It was hard.

Q. But would you get up?

A. Yes, sir; we got up there.

Q. Did you ever have to turn back?

A. No, sir; we never had to turn back. When we started we stayed on the river until we got what we went after.

Q. During what seasons of the year would you go up and down that river?

A. We would always go in the spring of the year. In the summertime the water was low and we couldn't do much good running in the summertime.

Q. How about your going up to Round Bottom. How often would you make trips there from Hinton?

A. Twice a week.

Q. All through the year?

A. No; not all the time through the year, because they would only get the staves that had been cut a certain amount, and the we would run until we got them all out. Sometimes we would run for three or four weeks and then we would have to lay off a week or two before we would get any more runs.

We carried the staves for Mr. Harder, the Standard Oil man. He was the tobacco man, and was handling the staves. We also carried tobacco and some lumber. I have seen lumber boated down the river, but couldn't say how much. If it was dry lumber, we would run about 7,000 feet on the boats and if it was green lumber, we would run about 5,000 feet.

I saw others boating lumber down the river—Charlie Cox, Albert Meadows, Luster Lane, and some of the Lilly boys, Ed Lilly and Bud Lilly. I have seen rafts going down the river pretty often from all up and down the river, from Round Bottom on down. They would have some at Round Bottom and some at Island Creek, some at Lick Creek, some at Harveys Ledge and down at the Bull Falls and at Blue Stone. The boats run after I quit running boats and I run some after I quit running regular.

435 The loads that I would bring from Hinton up the river were from five to seven thousand pounds. When we went

up as far as Glen Lyn, we would only take about four or five thousand pounds and we had to have four men in the head to do that. We had five men on the boat when we made a trip like that, four men on the head and the captain that steered the boat. It taken five of us in all.

I have been over the channel of that river. I have seen the Government do work on the river, blasting and drilling. This work started right above Hinton and came up to Greenbriar Shoals and up to Thompson's Mill Dam, sometimes called Wiley's Mill Falls just on the edge of West Virginia and Virginia. It crossed the line about twenty feet of the break of the falls.

They boated tobacco on the river. I boated some of it. I would carry about 14,000 pounds of tobacco on a boat. We would lay a double layer in the bottom and then put another extra layer on top. Some of us would sit on top of a high load and direct the men in the rear from the man in the head. We sat up and told them which way to move by our hands. We taken the tobacco to Hinton. I never taken any tobacco from Glen Lyn, but I have taken some from Round Bottom.

I remember Mr. Peter's son. In response to the question—"His name was J. Peters too," We called him Bud, for a nickname. He was with me on one trip. I don't know whether he was with anybody else or not. I remember because the trip was so hard on me.

We had passengers on the boat from the Salt Works to Hinton. I did not carry any passengers from Glen Lyn to the Salt Works. We would carry some extra passengers at times. They would get on the boat almost every trip and we would have six or eight or ten from the Salt Works to Hinton. I ran staves and lumber for Mr. Poone Burks.

Q. Did you ever see a steamboat on the river?

A. Yes, sir.

Q. When did you see that?

A. I don't know exactly what time it was, but I seen one on there when we were living about four miles from Hinton.

Q. What kind of a steamboat was it?

A. It had a water wheel on behind called a peddle water wheel and a steam engine on it.

Q. Any stacks?

A. Yes; a smoke stack.

436 Q. Just describe it as well as you can. How long was it would you say?

A. It was, I suppose, over a hundred feet long.

Q. And how wide was it?

A. About eleven or twelve or more feet wide, I couldn't tell you exactly how wide it was, because I never measured it, and I

was quite a young fellow then and didn't pay much attention to what the size of it was.

It had a deck. It was not a rebuilt bateau. It was a great big broad boat with irons up the side and a cab on it.

I have seen another boat on the river which I think was a gasoline boat. That was afterward. I can't tell you just when. It was the Davis boat—not as large as the steamboat. I am not sure, but I think it was a gasoline boat because it came higher up the river than the other one, as far as Mercer's Salt Works, which is twenty-five miles from Hinton.

We would not have a tide to run the bateaux on coming down the river, nor any tide going up the river and the reason we didn't have to have any tide was when the Government cut them channels they cut them and laid them in such a way that the water would press against them walls and make the water higher there and it was better for the boats to run through. The boats when loaded drew about two and a half feet. There had to be about two and a half feet of water or you would be likely to hit a rock or something. That was during low water. In high water we could go on just the same. It didn't bother us at all.

I seen the steamboat first when it came by Pack's Ferry. We lived right on a hill and could look right down on the river. We saw it going up the river. We could hear it—it would blow. Everybody would be running when it blowed. It was a big curiosity to the people to see anything like that.

The fertilizer was in 200-pound sacks and we would put about forty sacks on the boat. There was nothing but a store at Mercer's Salt Works, not a tobacco plant. It was carried there for the people. It was distributed to all the people throughout the country, but that was the headquarters to which tobacco was brought to be shipped. They had it in hogsheads when it come there. They had a man to go to the people's barns and they had the hogsheads and they would pack it in hogsheads and would bring it to the warehouse there. They had a regular warehouse there where they kept it until the boats got ready to go.

437 The warehouse was at the Salt Works. We rolled the hogsheads out on the boat.

Q. For how many years did you bring fertilizer down the river?

A. I don't know; we done it for several years.

Q. For as many as two years?

A. I don't know how many.

Q. Well, two or three years?

A. More than that.

Q. How many do you think?

A. Six, seven, or eight years.

The stress up and down the river were one at the Salt Works, and one at Round Bottom, and then there was another one which a Mr. Floyd Goodson had between Island Creek and Round Bottom. It was just a small one. He lived there. Then there was an old store house down at Fraziers or Crump's Bottom. An old man, Buck Smith, had a store across the river from Crump's Bottom, and there was another store at Bull Falls. People would bring their stuff to these stores and flag us to come and get it, and take it down the river for them. What we did was to carry the goods to the boats and to the stores and carry the people's produce back.

The witness on Cross Examination testified as follows:

I was a small boy when I saw that first steamboat, when my father was working on the Government improvement in the river after they opened up the channel. That was near the same time I saw it at Pack's Ferry, which is on New River about four miles above Hinton.

Q. About how long after you had seen your father working in the Greenbrier Shoals was it that you saw the steamboat?

A. I didn't keep any account of it because a boy don't keep any account of days, weeks, and months, and years, but it was after them channels was opened up and they quit working in the river, and after a while then the steamboat come up the river.

Q. It was shortly after the channel was built, was it?

A. I don't know when the channel was built, but after they quit working in the river, the steamboat come up the river.

438 Q. Can you give us any idea about the length of time after the channel was built that it was you saw the steamboat?

A. No, sir; I cannot.

Q. How big a boy were you when you saw it?

A. I don't know about that, because I didn't pay much attention to it. It was just a curiosity to everybody to see it.

Q. The whistle blew and you children ran to see it, did you?

A. Yes; and grown people was running to see it, too, because it was a miracle for them to see a thing like that coming up the rive

Q. That was the only time you saw it—the steamboat—was it?

A. It never did go no further that I know of.

Q. Were you working on the river then?

A. No, sir.

I used to work for Jim Peters at the Mercer's Salt Works. I shoved the boat and worked on the boat for him, and also worked on a farm for him when I was not boating. He had a whole lot of men at work. Some stayed on the farm and some were on the boats. There were old man Alex Kidd, Press Roach, Alf Mer-

chant, John Williams, Charlie Parks, Andy Medley, Jasper Smith, Timm Fitts, Mac Clark, Henry Clark, Jim Crump, and Henry Crump. Jasper Smith was a big man that shoved on the boats sometimes. He isn't living now. Different men would make different trips. I done anything that Jim Peters wanted me to do in connection with his business. I was paid a different wage and more money for boating than for working on the farm. He paid me fifty cents a day for my work on the farm and one dollar a day and board on the river. Sometimes I would work on the farm several days and then go on the boat. He boarded us on the farm also, but we didn't get but fifty cents a day. I hung to him in farming because we could get work on the boat more than those who lived farther away. He had two boats, one was worn out, and then he had a new one built called the "Bluebird:" I don't know the name of the old boat. It didn't make many trips after he had the "Bluebird" built. The "Gray Eagle" was a boat which belonged to Alf, John, and Jim Merchant.

Q. What became of that?

A. The river took it away.

Q. What river?

A. New River.

439 Q. What time was that and where?

A. I don't know, but the boat was laying there; there was a woman killed on the boat, and after the woman was killed, the boat never did run right, and they tried to stop all the leaks and keep them stopped, but finally that boat would sink all at once with a load on it, so they tied it up to the bank and let it sit there, and the river got up and broke the rope and took it away.

Q. Who killed the woman on that boat?

A. Fellow in the pen now.

Q. The man that killed the woman is in the penitentiary now?

A. Yes, sir.

Q. What was his name?

A. Brick Medley.

Q. Was he any kin to Andy?

A. He is some.

Q. You say he is his son?

A. No, sir; I said some—very little.

Q. Jim, you say that this channel that the Government cleaned out in the river was 2½ feet deep?

A. I said the boat would not run unless it had two and half feet of water or more, because the boat generally carried the rim to run about two feet or two and a half feet before it would clear without hitting any rocks.

Q. You had to have 2½ feet of water to run the boat loaded?

A. You have got to have that much water before you could with it loaded.

Q. How deep was the channel that the Government cut through these ledges and falls?

A. I don't know. I never did measure it.

Q. Can you give us an estimate of it—and also the shoals.

A. I didn't measure it, but they cut it deep enough so that the water—the rocks would not interfere with the boats when they ran.

Q. It was over 2½ feet, or 2½ feet, was it?

A. They cut it so that it would not interfere with the boats.

Q. How did they divert the water into the channel?

A. They took and cut in there kind of a little slaunch-
440 wise across the river—like this is the river (indicating), and they went a little this way (indicating), and the water will press against them when it is moving and will raise the water up, and that wall will throw the water higher until it makes it deeper to run in. It was not built straight down the river.

Q. They were not built straight down the river?

A. No, sir; they was built kind of angling.

Q. Is it easier to run in the channel or out of it, or was it easier when you ran the bateaux. Assuming that you had enough water in the river, would you follow the channel or not?

A. I did not boat in there before there was channels.

Q. I know that, but after there was a channel, say you had a four-foot tide in the river, would you follow the channel or go outside the channel?

A. If you had a four-foot rise, you could float anywhere. You always kept for safety out of the roughest water.

Q. Wasn't the water the fastest where the sluices were in coming over the falls?

A. Not if you had a four-foot rise. It is just the same all across the river.

Q. So, it is just as well to boat in or out of the channels, regardless of the stage of the river?

A. I will take the channels for mine.

Q. Coming up or going down?

A. Yes, sir; I will take the channels. Do you want me to explain it?

Q. Yes, sir.

A. Well, in the channels, when you are right at the head of the channel, there is a little kind of ease of water below the channel, and it would go around like this (indicating) and it shoots up against the wall, and when it hits it pushes it back

in here (indicating) until it runs into the knuckle, and we would have a man at the head, and as soon as it takes her head in there, the man will catch ahold of it and shoot it over there (indicating). You would not have as hard water as a man that would not understand it. But if you tried to put it against the wall, you would have to break it all the way, and you would have to ground it to get away from the wall, but if you lay over from the wall, in the other water, it is easier to shove.

441 Q. And it is in the channel——

A. (Interrupting.) It is like in the outer edge of the channel—in the main channel you would not shove into the main channel coming up, but run in coming down.

By Mr. THOMPSON. Is that downstream or upstream?

Q. You said coming up—that when coming, rather when going down you did not run in the channel.

A. We run in the channel coming down, going up we ran in the easy water.

Q. Is there easy water inside or outside of the channel?

A. In the edge of the channel, but when the water hits the wall it makes a curve and don't make the water as swift as it does against the wall.

Q. So you were always in the channel coming up and going down?

A. We were on the outer edge of the channel; right in the channel; we were right in the main channel heading out of the channel, and when we head into the eddy, we are in the main channel, then going and coming.

I don't know how many years I worked for Squire Peters, but I was with him a long time. There was old man Jim Johnson; I ran with him after I worked for Mr. Peters. I never counted how old I was when I left him. I paid attention to my work when I was working and didn't pay any attention to the time. After Squire Peters sold his store Joe Meadows took it and I worked for him. After I was thirteen years old I was right around at Mercer's Salt Works while all the time Squire Peters ran the store there, and run on the water. I was a pretty regular boatman for him.

I am familiar with Wiley's Falls. There is a channel through it, but it was never finished like the channels in the other falls. It ended at the Virginia and West Virginia line. It went through Wiley Falls on this side of the river (indicating). It was on the left bank of the river going up and on the right-hand side coming down on this side from Thompson's Mill. Thompson's Mill Dam is on the Round Bottom side, that is, the left side coming down the river. The last work where they ran the channel was at Wiley's Falls. My father worked there.

Round Bottom is below Wiley's Falls a mile or two, I think. Doc Dickerson ran the store there. I don't know what kin
442 he was to Jim Dickerson, but he was Squire Peters' son-in-law and Bill Shorter ran the same store, too. The store was not so far from the river.

I did not pay attention to where Round Bottom branch run. We boated through there and what made me pay attention was that we had a fishing hole right at Round Bottom which we used in the winter time. It must have been at least thirty feet deep. I don't know how long it was. We didn't fish over fifty yards up and down the bank between Wiley's Falls and Shumate's Falls. I know where Anderson Shumate's Falls is. It is higher on the river below Glen Lyn.

Q. Is there any obstruction in the river between Wiley's Falls and Shumate's Falls?

A. Any obstruction—what is that?

Q. I mean ledges or falls or shoals, sir.

A. Yes, sir; there is some ledges in there; yes, sir.

Q. Pretty much all across the river?

A. The way we run now, all them ledges is across the river. If we will take the man that run this upper ledge here (indicating) and a man would run this ledge on this side, and the water would carry the bateaux here (indicating) and it would run to the other side, but he would not go through the ledge here (indicating) because he would run into the other ledge.

Q. But that was the character of the ledges that you had between Wiley's Falls and Shumate's Falls?

A. Well, there was some ledges between them.

Q. Now, how much of a falls is there at Wiley's Falls?

A. It is a pretty big one.

Q. From the upper part where the water begins to fall to where it flattens out below the falls, what is the vertical distance, in your estimation?

A. I would think it is about five or six feet or more.

Q. And that is in a distance of about 35 or 40 feet, isn't it?

A. I would not know how to say that, because I could not say that to be positive about it.

Q. There isn't any sluice through there—there isn't any channel through Wiley's Falls, except the one that the Government cut, is there?

A. No, sir.

443 Q. Now, Jim, Anderson Shumate's Falls is a pretty tough one, wasn't it?

A. That is a pretty tough falls.

Q. Instead of having pretty even ledges going across the river, you have got a lot of ledges and rocks poking up there, haven't you?

A. There is some rock and ledges in it; there is two rock there, when I was running, that you would come into when you come into the head of them shoals.

Q. Did you say going up or down.

A. Going down, when you come into the head you are going down, and when you go into the tail, you are going up. When you get into the head, they come down here at Anderson Shumate's Falls and there is a sudden turnout here [indicating].

Q. Are you coming down the left bank of the river or the right side.

A. In coming down, I told you it was on the left—on the other side, coming down—that would be the left side.

Q. Coming down that would be the left side.

A. Yes, sir.

Q. And you hit the head of the falls?

A. You are not hitting the head of the falls because you come into the river when you leave the East River shoals, you can run pretty much all over the river in there, without running over them two first notches after leaving the East River shoals.

Q. Do you know what we call the Sand Bar up there where East River comes in?

A. There may be one there now, but there wasn't any there when I was running.

Q. You never heard of a place called the Sand Bar.

A. There has been places that are.

Q. There are some pretty bad places there, or were some pretty bad places there—not falls but shoals—I mean shallow water.

A. There is shoals there, because now, when I was running through there the last time I was through there with Peters—with Bud Peters.

444 Q. I thought you said you never went in there.

A. The last time I was through there.

Q. He was with you?

A. I was with him, and I had to reach my steering oar over my head to hold it. When I went to drop down, there was my oar, and when we dropped down, there was his oar in the bottom of the boat.

Q. Do you mean to say that there is an oar both in the front of the boat and the back of the boat?

A. There is an oar in the front and the back and the side.

Q. How many oars.

A. Three.

Q. On which side is the oar?

A. He generally works one side and then another, and one in the head and one in the stem.

Q. You had two men that stayed at it and a man——

A. (Interrupting.) That made three men employed—three men employed regularly all the time—one pulls a side oar, and one pulls—pilot—and pilots in the head and the other steers.

Q. That is coming down?

A. Yes, sir.

Q. Going up what do you do?

A. Going up he has got that pole right against his shoulder and walk back and shoving with that pole stuck in his shoulder.

Q. How many men would do it?

A. Two men in the head with just a common load but if we had seven thousand we got four men in the head.

Q. I interrupted you when you were telling me about Shumate's Falls a minute ago. Start that again and tell it your way about how you get though going downstream?

A. When we head into the falls we head in right up here and come down here and then there is two rocks down in there that you have got to get between them two rocks and if you don't get between them you have got trouble.

Q. If you don't get between them you have got what?

A. Trouble. You have got trouble when you get mess-
445 ing up with those rocks if you ain't a man that knows his stuff.

Q. Are those the only two dangerous things in there?

A. Those are the only two dangerous things in there because there are two rocks sitting up there and there ain't much room on each side of the boat when you hit them, and you have got to hit them exactly right or you don't go through.

Q. Is that where the main current goes through the falls?

A. You go down here and turn out this elbow and shoot out into the deep water right out here. There is what you call a little islar' that runs out here, and then water is behind that and this point will run you out into the river and you have to come out here.

Q. You have been indicating on your arm and bringing your finger down the outer edge of it and saying when you get to the elbow you have got to turn this way, which means to the left out into the stream?

A. You have got to turn out to the right.

Q. You have got to turn out to the right?

A. Yes.

Q. Turn out to the right to get between these two rocks? Where is the elbow in the falls?

A. I told you here is the elbow just up in the falls.

Q. In the upper end of the falls?

A. No, sir; it is not.

Q. The lower end?

A. Well, it is not right in the lower end either. It is up in the falls.

Q. About midway?

A. I wouldn't say midway. I say it is up in the falls. I never looked to see whether it was halfway.

Q. But that is the only thing you had to bother about in going through those falls was to make that curve between the two rocks?

A. You have got to miss them rocks.

Q. You have got to go between them, you say?

A. You have got to go between them. You have got to have an awful tide of water if you don't go between them and you
443 never do run on that tide of water because when it is that rough we couldn't carry no heavy loads in there.

Q. How much of a tide does it take to make it too rough up there?

A. We have never tried that but when we would have a whole lot of water the boss said, "Well, we won't go until the water falls a little." That is the way it is. I didn't pay no attention to that, just when he say go, then we would go.

Q. Coming up the river going through Shumate's Falls, did you have to go through the same route you would take when you came down?

A. You have to go up the same way.

Q. Follow the same course?

A. You don't have to follow the same course because you are not loaded so heavy, and, another thing, you can dodge things when you are going up the river that you can't dodge going down because you can go up the river so slow and then when you are coming down you are coming down in a rush and you have got to get in the clear then.

Q. But you said that you weren't hauling as much stuff. You mean that your boat wasn't as far down in the water?

A. Well, you know when a boat ain't loaded as heavy it ain't as deep in the water as it is when it is loaded heavy.

Q. The load that you would carry downstream on your boat from Glen Lyn would take your boat how far down in the water?

A. Well, when we are going down?

Q. Yes.

A. We got about three or four inches sticking out of the water and we always carry a stripe on the gunwale of the boat about four inches and when we load her to that stripe we stop loading.

Q. How deep was your boat, Jim?

A. Well, it generally taken about two feet and two feet and a half of water.

Q. I mean was it two and one half from the strip to the bottom of the boat?

A. Well, I didn't measure that. I told you it took about two and one half feet of water or over to run the bateaux.

447 Q: And you would load the boat that way coming down?

A. Well, sometimes we wouldn't have as much load but when we loaded her down for fair, that is the final load we put on her.

Q. Jim, you always had to have what you call a tide to get through Shumate's Falls?

A. No, sir; not always no tide.

I testified about moving Colonel Crockett from Crump's Bottom. I couldn't tell you what year that was. I will tell you how the thing come. Pay attention to how I tell you and you need not think I'm going to change because I ain't. When old man Anderson Shumate had the store we was working for him. Then Squire Peters had the store and we worked for him. When Mr. Joe Meadows had the store we were working for him. Then Mr. Anderson Shumate died and Mr. Bal Shumate took charge of the store and put one of his boys over there and then after his boy died he put another clerk in there. When Joe Meadows got married and went away, Mr. Anderson Shumate put one of his sons in there.

Q. Jim, I asked you what year it was?

A. I wouldn't tell you that because I don't know what year it was because I didn't pay that much attention to it.

Q. Will you tell me within ten years of it?

A. I am telling you the way we worked it and I wasn't paying no attention to the years.

Q. And you don't remember whether you were working for Squire Peters or——

A. I told you I run with Squire Peters and I run with Mr. Bal Shumate and Mr. Joe Meadows.

Q. I want to find out for whom you were working at the time you were on the boat to move Col. Crockett from Crump's Bottom?

A. Squire Peters was the man that had the boat.

Q. Jim, do you remember the Spanish American War?

A. I know it was going on but you needn't ask me about what year but I ain't going to tell you because I never paid no attention to it.

Q. I am not going to ask you what year it was.

A. I wasn't in it.

448 Q. Was that the time you moved Col. Crockett?

A. I don't know. I couldn't tell you that. I never paid any attention whether it was before or whether it was after. If you will pay attention to me, I am a man that don't lie and I try to tell the truth and when I tell anything once I

mean just what I said. I aim to tell the truth. I live that way around my home. I have got plenty of witnesses and things around my home. I try to tell the truth.

I was thirteen years old when I first commenced boating and I reckon I was older than that when we moved Colonel Crockett. I was married I don't know what year. I don't know how old I was. I know that it has been about forty years ago. I moved Colonel Crockett before I was married. I guess it was before 1896 that I moved him. There was two boats of us. Andy Medley was on one of them. I was on the other. We went to the falls of the Narrows and there we doubled over. We unloaded what was on my boat onto the boat that Andy Medley was on. I never paid no attention to the falls of the Narrows because you see I wasn't above there on no boat. I couldn't tell you that. We unloaded the stuff from my bateau to Andy's bateau somewhere close to the Narrows. I don't know whether above or below. Then we goes back and picks up another load because they was waiting on some stuff at the saw mill. We let the other boat go on. And we went back and taken the other stuff and goes on back to the sawmill. When we cut out the other boat was there.

Q. It was dark, wasn't it?

A. When we cut out we left them there.

Q. What were they doing, Jim, when you left there?

A. I wasn't paying no attention to that.

Mr. THOMPSON. I don't understand he gave any testimony as to what they were doing. He said he turned his back and they went on down the river.

Mr. ABBOT. I think he testified in Hinton they were cooking supper.

Mr. THOMPSON. That was Hinton, not here.

By Mr. ABBOT:

Q. Were they cooking their supper when you left, Jim?

A. I told you I didn't know whether they were or not, because I didn't say anything about supper. When we transferred the load we turned around and cut out and goes on back.

Q. Well, had you gone through a rather precipitous falls or a pretty steep falls in the Narrows before you unloaded your furniture?

A. I don't know that because when the Captain says "this is as far as we will go, we will double the load on the other boat and we will go back and pick up."

Q. Had you gone above the mouth of East River then?

A. Yes, sir.

449 Q. Were you as far as Lurich?

A. Yes; Lurich is not but two miles above East River.

Q. And you had gone above Lurich?

A. Around up in there.

Q. And you had gotten up to a point where you transferred this load but you don't know whether you had gone over a big falls?

A. I didn't pay any attention to that.

Q. Jim, you would have remembered it if you had, wouldn't you?

A. We never paid attention to the falls because we never pay no attention to falls much when we are running without we are looking for danger and then if we are running at night, why then we got certain men that we will trust.

Q. You weren't running at night this time, were you?

A. It wasn't right then.

Q. And you don't remember whether you went over about a six foot falls before you transferred your cargo of your boat to that of Andy Medley?

A. Didn't have no falls that I know of.

Q. You didn't go over one before you made the transfer?

A. We didn't have any such falls that I know of.

Q. You say you know you didn't go over any falls of that character?

A. I wouldn't say that. I didn't pay any attention how high the falls were or nothing. I don't know that.

Q. How did you know where you were, Jim?

A. Didn't the man say, "This is as far as we will go. We are up close to the Narrows now and this is as far as we will go. You all can make it from here provided I give you so many hands," and asked the other Captain, "Can you all make it?" And he told him—he says, "Well, I guess I could." Well, we give him the other men and he took us two and went on back.

There were four men in the head of each boat—five men to a boat over rough water. There were five in Andy Medley's boat and five in my boat and then we gave them two off our boat. We gave him the load we had and two of our men to help him on. I don't know whether at that time I had gone over a falls of about six feet. I haven't been over the falls in the Narrows—the Falls of the Narrows, I believe it is called. I don't know anything about it. I don't know the man named Chap Lilly.

450 I knew Bud Lilly and Ed Lilly. I don't know Chap Lilly.

He may have been working on the boats, but I don't know. None of the Lillys were on the two boats that I was on that I know of. Nobody came down to either of these boats and hauled the furniture away in a wagon on that trip when I was along.

Q. Are you sure there was more than one boat on this trip?

A. Well now, if two boats was along there would have to be more than one boat. If two boats was along it is more than one, ain't it?

Q. And you were sure there were two boats on this trip?

A. Yes; there was two boats because we doubled over and let the other man go on and the other one run back.

Q. Have you ever made any other trip with Col. Crockett's furniture than this one that you have mentioned?

A. No; never moved him but once.

Q. And you did not on this occasion hang up on Shumate's Falls and then unload your bateau, the furniture from your bateau onto wagons when it was hauled away to Glen Lyn to be put on the railroad train?

A. No, sir; now I will tell you. You can't get to the river at Anderson's Falls.

Q. You cannot get to it?

A. No, sir, you cannot.

Q. You can get to it below there, can't you?

A. No, sir; you can't get into the river below there.

Q. Where is the nearest point that you can get into the river?

A. Below there? I am telling you the peak that runs out into the river—sand settles in there and you can't get to the river at all and then above there the rocks is so big and rough you can't get to no river with the wagon.

Q. And you are perfectly definite that you can't get into the vicinity of Shumate's Falls with a wagon?

A. No, sir; you couldn't get in there. You couldn't get into them falls with a wagon.

Q. But that isn't the reason you say that none of this furniture was taken off of your boat and put——

A. Didn't take none off of ours, the one we was running.

Q. The only time the furniture was taken off that one you were running was when it was transferred from one boat to the other at the falls?

451 Q. Certainly on this occasion no wagon came and got the furniture off of your boat?

A. No, sir; they couldn't get in there.

Q. And you had gotten above Lurich?

A. Yes; they couldn't get in there.

Q. Jim, the store you were talking about at Round Bottom, that is on the left-hand side of the river as you go down?

A. Round Bottom is on the left-hand side as you go down.

Q. And the store is in Round Bottom?

A. Yes, sir.

The witness on Redirect Examination testified as follows:

Q. Mr. Smith, did you ever have any trouble getting through Wiley's Falls, either going up or coming down?

A. No, sir.

B. T. JOHNSON, on Direct Examination testified as follows:

I believe I will be 75 years old the 10th of March. I have lived at Narrows since 1875. When we first moved to Narrows we didn't have much roads. My father was an old teamster, was in the horse business, followed wagonning all his life, and did a great deal of hauling. Regarding the number of horses required because difficulties with roads, I have known him to hitch six horses to pull a two-horse load.

I have seen boats run up and down New River. Some were a good deal longer than this room, some a little longer, and some a little shorter than this room, according to my recollection.

Q. What did they call those boats, if you remember?

A. Keel bottom boats.

Q. Do you know how far down the river they went?

A. Just from hearsay, they went to Hinton, maybe below Hinton a little bit.

Q. Did you ship anything on those boats to Hinton?

A. Yes, sir.

Q. State to the Court what you shipped.

A. I shipped mostly meal, and I shipped tobacco.

452 Q. Did you raise tobacco in those days?

A. Yes, sir; I raised tobacco, me and my father and brother.

Q. How would you prepare your tobacco to ship it to market?

A. We would put it in big hogsheads, we called them.

Q. And from what point on New River was this tobacco placed on the boats?

A. Well, what I shipped I shipped from Narrows, mostly.

Q. State to the Court whether or not other inhabitants of that section raised tobacco.

A. Yes, sir; pretty much, only way we had to get a little money.

Q. Where did they ship their tobacco from?

A. Along different points, Glen Lyn and on up this way, I suppose.

Q. What would these boats bring up the river from Hinton?

A. They would bring a little of everything.

Q. Can you state some of the articles to the Court?

A. They would bring salt, coffee, sugar, rice, and many other things. I just can't remember, but they was pretty well loaded.

Q. How far upstream would they go, if you know?

A. They would go above Narrows somewhere, I don't know just where.

Q. That was—first, how would you know when those boats were coming?

A. Well they had bugles, great long bugles, longer than that [indicating with hands], and if they wanted to make a big fuss they blowed a big bugle and if they wanted to just make a little fuss they had a little bugle they blowed; they had a pile of them, and when they blowed they let you know they was pretty close, and you could tell pretty much from the sound of the bugle how far they was off.

Q. Did you engage in cutting any timber on New River?

A. That has been my business all my life—timber business.

Q. What disposition did you make of your timber; how did you get it to market?

A. Them days all we could do with our timber was to make staves out of it.

Q. Where did you ship the staves?

A. I would load them on the boats and they would go to Cincinnati and around. I don't know where all they did go. I
453 sold them to other people. I shipped them.

Q. Where did you place them on the boat?

A. All I shipped I shipped from Narrows is my recollection.

Q. Were other residents of that community cutting staves?

A. Everybody that had any timber would.

Q. Where were the staves cut around Narrows shipped from?

A. They come up by Wolfs Creek mostly.

Q. Where were they placed on the boats?

A. Right along the brink of the river.

Q. You spoke of Wolfs Creek, the mouth of Wolfs Creek is just below Narrows; is that right?

A. Right below Narrows.

Q. Do you recall when James and Sons were cutting on the river?

A. Cutting logs?

Q. Yes.

A. Yes, siree.

Q. State if you ever had any business transactions with James and Sons.

A. Oh, yes; I think I sold them some logs. Now they manufactured their own lumber, and I sold them some big popiar logs.

Q. Did you sell anything else?

A. I don't remember I did.

Q. Do you remember a gentleman by the name of Mr. Arter?

A. Theodore Arter is the man I sold the meal to that went down to James' Mill.

Q. Was he employed by James and Son?

A. I think so; he always come and got it and paid me for it.

Q. Where was this meal shipped from?

A. Narrows.

Q. Do you know where this meal was delivered?

A. I do not. I didn't follow it down; he would always come there and buy it and settle for it.

Q. Do you know where the plant, the lumber plant, of James and Sons was located; I mean the mill?

A. Right close to Hinton.

454 Q. Do you recall when the bridge was constructed across Wolf Creek, when the Pocohontas line was put in by the N. & W.?

A. Yes, sir.

Q. State whether or not you furnished any timber in connection with the construction of that bridge.

A. Me and my brothers and father did; I don't think I did by myself.

Q. What was the character of those timbers?

A. Oh, big stuff; that big square [indicating with hands]; a heap of it.

Q. Where was it cut?

A. Cut right around in the neighborhood.

Q. How was it transported down to Wolf Creek, or the side of the bridge?

A. It just needed hauling in there; it didn't need transporting down the river, because there had not been no construction done down there then.

Q. Did you ever raft any logs or timbers on the river?

A. Yes; I have rafted logs.

Q. From where?

A. Up above Narrows a piece.

Q. Where did those logs go?

A. To a little mill I had down at Narrows, and I think I would make rafts, my recollection is, out of oak and poplar and pine and make them stay up, in order you know, and I think I sold a good many of them logs to a fellow by the name of Zinc; they come from down here at Christiansburg, and they cut them into timber for the railroad, but I don't know how they handled them.

The witness on Cross-Examination testified as follows:

I will be 75 the 10th of March. I was born in Campbell County, Virginia. I lived in Oakvale in Mercer County which was called Princeville when I lived there. I did not live there all of the first twenty years of my life. I was scattered around, you might say, from pillar to post in that neighborhood. Sometimes we would be there and sometimes a few miles away.

I have never operated as low down New River as around Mercer's Salt Works, cutting timber and staves. I went to
455 Narrows about the time the War closed. I was not so very big then. There is no other B. T. Johnson at the Narrows now. There was until a few years ago. The other man who is dead now was an uncle of mine. He did a little of everything, as far as his business is concerned. I have been in the real-estate business a little bit.

Q. Did you have any difficulty rafting logs from Ripplemead to the Narrows?

A. Not a bit, what I put in.

Q. Never lost any logs?

A. Not that I remember.

I wouldn't put in enough to lose any. I rafted them together and tied them pretty good. I remember when Zinc Brothers tried to raft logs from above Pearisburg to Narrows. It is my recollection that they turned their logs loose, rolled them in, and followed them down to the Narrows and had teams there to pull them out right away. They didn't lose any that I know of.

I remember a man by the name of William Alcott and when he tried to raft some logs to Hinton in 1885. He was a man who would always have his own way in spite of the dickens. People told him to put light logs in with walnut logs and he would be able to save them, but he never would do this and was bound to take a chance or he could have saved a heap of logs which he lost. He lost a good many walnut logs which he tried to take down the river. Seems to me the raft would break down about what they call Bull Falls. I don't think the raft broke at the Falls of the Narrows. He got over the Narrows pretty well. After that Mr. Alcott went into the export business at Narrows or Pearisburg. He would get his lumber to market on the railroad after that. I used to sell him lots of export lumber 5 x 12.

We used to haul some tobacco from Narrows to Lowell and to Dublin. I have an idea I have hauled a two-horse load with two horses. I am not positive. We used to use six horses. We had to, to do any good going on the roads in the condition they were in.

I remember a man by the name of Mike Clark. He came to Narrows to manufacture tobacco and built a factory there. I don't think he built two factories. I remember him building one where the Narrows Motor Company is now. It was a big one. He figured on building a factory also at the Narrows to roll tobacco from the warehouse into the boats, but he never done it I
don't think. I don't know why he didn't do it. He already
456 had the factory up on the hill built.

I used to ship staves down the river just about a year before the railroad went into operation. I loaded them on the

boat and shipped them down to Hinton. I couldn't tell you what company owned the boat.

I don't remember talking to you about this river on the 10th day of November 1931, at Narrows, but you and me did talk something about it. I am pretty familiar with my signature. I believe that is my signature on the paper which you have handed to me. It looks pretty much like it, I feel that it is mine. I don't know; I could be real definite, but it looks a whole lot like it.

I have not talked about these things with anybody that I remember since I talked with you in 1931. I have not talked with anybody in the last month except Mr. Noel. I talked with him just about once. He may have come to my house twice. I believe that he did. It wasn't more than twice.

Q. I will try to refresh your memory a little. You remember stating on the 10th of November 1931 you had never seen any use by boats on New River?

A. Well, just read that over.

Q. (Reading.) "Never seen any use by boats. I tried to raft some logs myself but too rough. Lost a lot of logs and gave it up. This was from Ripplemead down to Narrows."

A. Oh, yes.

Q. Did you make that statement?

A. I believe I did make a statement like that to you.

Q. (Reading.) "This was from Ripplemead down to Narrows."

A. No; that was to Curves, it wasn't Ripplemead.

Q. (Reading.) "Zinc Brothers tried to raft logs from above Pearisburg to Narrows. Rafts broke and they had to give it up same time as above. William Alcott tried to raft walnut logs from Narrows to Hinton about 1885 and this raft broke up at the Falls in the Narrows and he lost logs and he was financially crippled." "Q. State what, if there was ever any navigation on New River by steam, rafts, or otherwise, and if so, the points between which and the times and result." And did you not state, "None except above?" What you had already told me.

"Q. To your knowledge, has any trade or traffic, that is, the hauling of products, person, or the floating of logs, etc., ever emanated at a point above the Radford Dam site, and gone into the State of West Virginia, on New River, or vice versa?"

457

"A. Never heard of it."

A. Never heard of it; no sir.

"Q. Aside from your actual knowledge, if you ever heard of any of the above being done, please state what you heard as to time, places, and persons, and the source of your information."

"A. Some batcaux from Salt Works in Mercer County to Hinton." Did you make that answer?

A. That is where the boats come from, down above Hinton and the Salt Works.

"Q. Have you ever heard that traders or trappers made use of the New River from the point above the site of the Radford Dam into what is now the State of West Virginia?" "A. No."

"Q. Please state from your own observation, what the character of New River is, that is, with reference to depth, width, falls, rapids, shoals, ledges, and floods?"

"A. Series of pools, shallows, falls, and ledges with little water flowing over them in normal times."

"Q. Please state what you know about the improvement of New River by the Federal Government, whether this improvement facilitated trade and travel on the river and enabled trade or travel emanating above Radford to get to West Virginia, or vice-versa, and what the present condition of the improvements is?"

"A. Heard something about it but I think they gave it up."

Then there are some other questions to which there were no answers. Did you make those statements to me?

A. I expect I did.

Q. Did you make the following answer to this question asked you:

"Q. Is the New River in its ordinary or improved condition susceptible of being used as a highway for commerce over which trade are or may be conducted from a point at or above the dam site at Radford into West Virginia? (In making this answer, consider the transportation of product, persons, logs, etc.)"

458 "A. I wouldn't consider it anything at all on account of too many shallows and ledges and in high water very rough."

Did you make that answer?

A. I don't remember I did. Of course you can make New River anything you want to by spending money enough.

Q. Then this question was asked you:

"What have you heard old men now deceased say as to the river in Virginia being susceptible of being used as a highway over which trade and travel might be conducted?"

"A. Heard old folks say that it was no use to try to make the river navigable."

Is that the answer?

A. I never thought so myself.

Q. Ever hear the old folks say so?

A. I never did think it was a money-makin' proposition.

Q. Did you make that answer to me?

A. I might have done that.

Q. Then this question was asked you:

"Please give any other information which you may have bearing on the subject?"

"A. About 1875–80 people in tob. business here made a contract with someone down about Crump's Bottom to bring up bateaux and haul tobacco from here to Hinton. Couldn't get bateaux over falls in the Narrows and it was given up. The thought that the river could be navigated brought Mike Clark here from Lynchburg. He put up factory but he said river too dangerous and he would not try it. Hauled tobacco by teams from here to Dublin and Lowell and he had to quit without making use of river. In fact, he died here. Wouldn't have come but for the idea of using river. First factory at where depot now is, but when couldn't use river built another factory up town."

A. No; he built the other one first down in town; he didn't build no factory there, but just put up a little shanty to protect the tobacco he would ship on the boat is all he done there.

Q. But you say that is your signature?

A. It looks mighty like it.

459 Q. I will ask you to file that as a part of your testimony.

By Mr. AIKEN. We are putting on our evidence now. If the gentleman wishes to offer it later he may do so.

By Mr. ABBOT. I offer to file it.

By the COURT. I expect Mrs. Lewis has it anyway.

The witness on Redirect Examination testified as follows:

Q. You say you think this is your signature?

A. Yes; it looks mighty like it.

Q. Was any other part of this statement read to you in your handwriting?

A. I don't think so.

Q. Do you recall the circumstances under which this statement was given to Mr. Abbot?

A. No; I just can't say.

Q. Do you know where you were?

A. He said it was there at the Narrows.

Q. Does this statement represent what you told Mr. Abbot or what Mr. Abbot told you?

A. It looks a little more like what he told me.

Q. How long did Mr. Abbot spend with you?

A. Well, I can't state that. He was there a right smart while.

Q. And he would ask you questions and make statements to you, is that right?

A. Yes, sir.

Q. And you said nothing here is in your handwriting except your signature, I believe?

A. My signature is all, it looks like.

Q. Do you recall whether the statement was read to you after he interviewed you?

A. I don't think it was.

Q. Did you read it over afterward?

A. I don't think I did. I don't remember reading it.

Q. Do you remember if any witness was present when this statement was given?

A. None I remember.

Q. Do you recall any of the circumstances whatever attending this interview which you had with Mr. Abbot?

A. I was generally pretty busy and I expect me and him got through mighty quick. I was generally kept pretty busy
460 and hardly ever liked to take much time.

Q. I will ask you if the evidence which you have given from the witness stand here today, under oath, respecting traffic on the river is the truth as you recall it?

A. As I recall it.

By the COURT. You have stated here on the stand you made the answers to Mr. Abbot contained in that statement. Do you mean to say now they were not true when you told Mr. Abbot that?

By the WITNESS. I don't say that. I might have made them statements, and I might not.

The witness on Recross Examination testified as follows:

I have been sick about a year lately. I am right smartly improved now. There is a doctor here with me today. My wife insisted that I let the doctor come along. I didn't consider it necessary, specially.

461 J. A. MEDLEY on Direct Examination testified as follows:

I have been living at True, West Virginia, four miles above Hinton on New River, for twenty-five years. I was born at Cash's Hill on New River and have lived on New River all my life.

I have worked on New River at boating and running ties. I have been a boatman there since I was thirteen or fourteen years old, off and on, all my life. I will be 73 years old the second of January. I knew and worked for a man called Squire Peters. I worked on the farm and built and run boats for him, I would say, for five or six years. He lived at Mercer's Salt Works, which is on New River.

The boats I worked on were bateaux about eight feet wide and 65 or 70 feet long. They ran up and down the river from Hinton to Mercer's Salt Works and from there to Radford City. We made a trip up there.

When these boats came up stream we put four people in the head of them and shove, carrying a load of 8,000 or 10,000

pounds, as far as we know. We carried merchandise to Mercer's Salt Works and up to Roundbottom about once a week in the summer time. Sometimes in the winter we made trips after lumber got coming in, shoving a pole against your shoulder, but after that we got motorboats and put them on the river and made a trip every day.

I made trips to Glen Lyn. As far as I can remember that was about 35 or 40 years ago, hauling merchandise and fertilizer for Jim Peters, who was known as Squire Peters.

Some of the men who boated down there for years with Peters were Jim Smith, Ed Smith, and old man Kidd off the Gauley and Mud River—they used to boat down there and come there and give them a job and stayed there for years with old man Peters. Others besides myself were Bres Rhoades, old man Aleck Kidd, Ed Medley, my boys, and myself.

We went up to Glen Lyn to get merchandise. We brought fertilizer from Glen Lyn in Virginia to Mercer's Salt Works in Sommers County and Mercer County. The post office is Mercer's Salt Works, Sommers County, West Virginia. That was a long time ago, I can't remember everything. That was about 30 years ago. We went off and on. Every spring we would go up there and get stuff. We would get fertilizer and bring it down
462 from Glen Lyn when they made the N. & W. This fertilizer was put up in sacks which I think would weigh about 100 pounds, somewhere along there—125 or 150 pounds.

I was well acquainted with a man named John Crockett. We taken him up here to Radford. I was on the boat all the way to Radford and returned with it. We moved house furniture for him. That was about 35 or 40 years ago.

I owned a bateau myself and ran it on the river carrying lumber, staves, tobacco, fertilizer, and merchandise all up and down the river. I know a firm by the name of N. H. Nabb & Company, and worked for them boating staves which I got up and down the river here, Bull Falls and Wiley's Island.

Q. Where is Wiley's Island?

A. Right across below the old State. West Virginia is different.

Q. You mean it was in Virginia?

A. Yes, sir.

Q. Was it in Virginia or West Virginia?

A. Right across the line. There are four counties and two states on the corner there.

I know a place on the river called Quinnimont. I run a boat there from Quinnimont down to Quinnimont Gorge about two miles. Quinnimont is down the river below Hinton, below Sandstone Falls. It is about 35 miles from Hinton, a little above

a place called Stretcher Neck. I was boating for B. L. Rhoades down there, down to the yard of Quinnimont about two miles.

We built a boat down below Quinnimont for old man Lee and Stonewall Mining Company, and run it down around the mountain from Piney Branch down to Stretcher Neck.

I recall the construction of the Chesapeake and Ohio Railroad Company at what they call the Gorge and saw materials used in that road hauled on the river up to Hinton by boat. They were brought upstream from West Sewell and East Sewell. I know a place called Sandstone Falls. They had a crew above it and another one below it and hauled goods around there with teams and put the goods back on the boats and brought them to Hinton.

The draft of the boats when loaded depended upon the kind of load. We would take about 12 to 18 inches. They
463 was 22 and 23 inches deep and draw about 21 and 22 inches of water loaded down. The river was used for the carrying and hauling of this material through to the country where it was needed. There were no roads at all, only bridle paths.

Q. Did you ever see any moborboats on the river or steamboats?

A. Well, yes, sir; we have run them.

Q. You have run them?

A. Yes, sir; got one down there at home now laying in the cellar, a nine-horsepower engine, that we run on there on a 25-horsepower motorboat—hook it to a bateau and go up the river with it.

Q. When did you do that?

A. Well, it has been about twelve or thirteen or fourteen years ago.

Q. How many years did you run motorboats on the river?

A. Well, ever since we got sense enough to get a motorboat, you know, we quit shoving with poles. You take a pole and put it on your shoulder and shove them and then they built motorboats.

I have rafted all along the river from Bluff Post Office to Hinton, which is up on the river. St. Lawrence Bluff is what they call Roundbottom. I have seen two or three steamboats on the river years ago.

Q. When did you see them?

A. Oh, it has been years ago. It was a boat come from Radford and I forget that man's name. He had a little motorboat, nice built boat, and brought there and they loaded it and they taken it off and I don't know where it went to.

Q. How do you know it came from Radford?

A. They said it did. They told me it did.

By the Court:

Q. Where was it you saw it?

A. It was Hinton and then I went in it a few trips up and down the river to Bull Falls., The Martin boys were heading for the fellows after they got down there.

464 I have shipped ties on the river to the Lilly Lumber Company. The Chesapeake and Ohio Railroad, or the Pennsylvania, bought a few ties there and shipped them in cars on the C. & O. Railroad. I don't know where they took them. There were thousands and thousands of ties that were shipped down the river. I have rafted or loaded ties. We had a contract to load them and raft them. You couldn't run them unless we would put them up and raft them.

We stopped hauling lumber on the river because they built roads and that cut us out. They began hauling by wagon and automobile trucks.

I can't remember how many sacks of fertilizer I would carry on one of my boats, but we could bring a whole lot of them. We never did count them though.

Q. You haven't any estimate?

A. Well, a pretty good lot of them. We didn't take time. We worked for a man that had to move them and load them and carry them on our backs to the river and go on down, for old man Jim Peters.

Q. Do you recall a ferryboat having gotten loose up above Hinton and floating down the river?

A. Up above Hinton?

Q. Yes.

A. Well, Mister, I could tell you a whole lot but the other people will——

Q. I just want you to answer my question.

A. About them getting loose?

Q. Yes.

A. Yes, sir.

Q. Tell that, what happened about that boat, if you know?

A. About them getting loose?

Q. No; about the ferryboat getting loose.

A. Well, I reckon the flood must have got it.

Q. Did you ever have anything to do with moving that boat that went down below Hinton?

A. We moved a boat from below Hinton back up to Hinton.

Q. You said you moved it from Hinton up to Hinton?

465 A. No; we moved from down where old man Richardson lives up to Hinton for Dr. Quisenberry.

About 4 or 5 of us were on the boat when we moved it upstream. It was about 40 or 45 feet long and about 9 or 10 feet wide. We didn't measure it, but I built enough boats to know its size.

I knew a man downstream below Hinton on the river called Old Man Bob Flannagan, and worked for him on boats. He didn't own any boats. I took my own boat. Hauled stuff, lumber, staves, to Hinton. We didn't boat from Hinton down the river and bring it up there. As far as the shoot goes is Hinton. We boated from Crump's Bottom and all them places. We boated materials from down below Hinton downstream only down at Quinnimont for B. L. Rhoades.

The witness on Cross-Examination testified as follows:

I didn't do any hauling from Hinton to Quinnimont on the river. I said I done the hauling from what they called the head of Quinnimont Shoals down to where they loaded it on the yard—switching. I boated down there on a pool just about two miles long.

The boating I mentioned from the mouth of Piney to Stretcher Neck tunnel was for a different man. That was for Lee and Stonewall, ran to Stretcher Neck and go down the left-hand side. After you left Prince you crossed. There used to be an old bridge there way back yonder, you know, and take it to I don't know where. We crossed there and they got me to go down there and build them a bateau and run some lumber down there for them. We run the lumber from Piney Branch down to around the Narrows of Stretcher Neck. We didn't run the bateaux down there, we built the boats down there. We didn't run our boat from Hinton down there because they could get lumber down there cheaper to build it than we could afford to take it from Hinton.

I first saw boats on the river as far as I can remember when I was a little kid about 10 or 12 or 13 years old. I know where Narrows of New River, a town in Virginia, is.

I don't know of any Bluff City except Bluff Post Office below the Narrows of New River. It is about six miles back down the river from Narrows.

I worked off and on for Squire Peters for five or six years.
466 I couldn't tell how many years. Beside boating for him, I run the old salt mills, me and the old lady and kid. We also planted corn and beans.

Q. These trips that you mentioned that you went to Glen Lyn, what time of the year were they made, Uncle Andy?

A. Well, we didn't keep no figure of that at all. We was working for old man Jim Peters and we couldn't tell what time.

Q. What did you get up there to bring down?

A. Fertilizer and merchandise.

Q. Was that usually in the spring of the year?

A. Why, yes.

Q. It was in the spring of the year?

A. Well, you use fertilizer in the spring; you don't use it in the winter, do you?

Q. I don't know. I was wondering about it. So it was in the spring that you made the trips to Glen Lyn?

A. If they called us we would go there in winter or any time. We would often get trips in the spring of the year to bring fertilizer down to Summers County from Glen Lyn.

Q. You would make an annual trip up there in the spring to get fertilizer; is that right?

A. We would go up there and get merchandise?

Q. Did you ever go up there just to get merchandise?

A. We have moved a few people from up in there.

Q. Yes; but I wondered whether you had ever gone to Glen Lyn to get merchandise other than fertilizer?

A. Well, you people, surveyors of New River, you ought to see what they have done over there. The company has got about six miles of railroad made in there and they couldn't get nothing through there if there hadn't been boats.

Q. The railroad you talk about is down there below Round Bottom, isn't it?

A. Well, from Bluff Post Office on down towards Walker Island. How could we get stuff in there and no roads if we did not have boats?

467 Q. That is where you did your boating, Uncle Andy, to those people working on that roadbed?

A. Well, there wasn't nobody to bring it in. How could we get stuff there unless we had boats to bring it? You couldn't haul it along the roads because there wasn't no roads. We even then would go up at Mercer Salt Works from Kanawha on horseback and get salt.

Q. That was in 1880 or 1881 that that roadbed was being repaired?

A. What?

Q. What year was that, that that was being done?

A. I don't know anything about it. I was born in 1864. I don't know what they done before that because I wasn't here.

Q. I said 1880 or '81. That is a good while after you were born. You remember when they were doing that grading down there below——

A. I didn't keep no figures of it at all.

Q. And you say they were the people that you supplied with bateaux on the river?

A. People?

Q. Yes.

A. Yes, sir.

Q. And you boated up the river to take care of those hands working on that stretch of roadbed down there, didn't you?

A. On the roadbed?

Q. Yes.

A. No; there wasn't no roads then. We was working on the river.

Mr. THOMPSON. I don't believe he understands you when you say "roadbed."

A. Do you think it was a hard road? There wasn't built no hard roads. It was a bridle path. Maybe you take a two-horse wagon to go down to Hinton and get a saw and bring it back in about a week.

Q. Do you remember when the railroad company graded the roadbed down below Round Bottom, from Bluff Post Office down the river?

A. Yes, sir.

Q. Did you do any work in connection with that?

468 A. Well, I stayed with old man Tom Dickson, and carried dinner down there to the bosses.

Q. Wasn't there considerable boating done for the people working there?

A. They was running boats then when I was a little kid and bring stuff in there to the people working on the road up to Bluff Post Office.

Q. Do you remember Mr. Pine that had the store at Round Bottom?

A. Lewis Pine?

Q. Yes.

A. Yes.

Q. That is where they would bring it?

A. Yes; they would bring it there.

Q. I don't believe they ever laid any tracks down there or ran any trains along there, did they?

A. No, sir.

Q. They just prepared this roadbed?

A. Well, sort of like they done today. They start on something and quit it and leave it.

Q. And that is down the river from Bluff Post Office to Round Bottom?

A. Well, it is Round Bottom.

Q. And you said that was about six miles long, Uncle Andy?

A. Sir?

Q. That was about six miles long?

A. Which—the railroad?

Q. The grade?

A. No, sir; it wasn't six miles long. I didn't say that. I expect it was about two miles long.

Q. Andy, were you engaged in this hauling of goods up to Hinton during the construction of the C. & O. Railroad that you testified about?

A. No.

Q. Did you see that done?

A. I seen it. I told you I was about twelve or thirteen years old when they would bring the stuff in there.

469 Q. And you saw stuff brought in where?

A. Brought in to Hinton from down the river.

Q. You didn't see it come up that river, did you?

A. They would shove it. It is bound to come up there.

Q. How far down the river from Hinton did you see those boats?

A. Well, we walked way down below Hinton. That was before there was mighty few houses in Hinton when that was done.

Q. How many were there—two?

A. I never counted them. There might have been five or six. I didn't count them. I didn't have time, you know.

Q. And you say you were twelve years old?

A. I said I was twelve or thirteen years old.

Q. Why were you so pressed for time then?

A. Pressed for time?

Q. Yes; you said you didn't have time to notice how many houses there were in Hinton.

A. A little kid couldn't run around—there might have been fifty, I don't know—running around there he couldn't count the houses and didn't think about it. We wasn't counting them at all. There was no time, you know.

Q. This boat that you talk about that came down the river from Radford—do you remember the gentleman who owned that boat?

A. No; I don't remember him. I told you before that I didn't remember the man. I remember there was a Martin helped him run after he come down there and they loaded it and I don't know where it went.

Q. You don't remember whether it was a man named Mr. Robert McWane, do you?

A. He didn't tell me his name and I never asked him his name.

Q. It was a motor boat with a little cabin on it, wasn't it?

A. Well, it was a pretty good boat, nice, you know, like they have on these great big places. On the Kanawha, down there they have all kinds of boats.

470 I seen that boat come down the river from along in the shoals there. I don't know whether it was the boat's first trip or not. I don't remember what year I saw that boat. I didn't

keep no dates of it at all because we see things come into that country and we didn't have time to keep dates and survey the river. I didn't keep any account of how long that boat operated around Hinton. I think they shipped it away from there. I don't know what became of it.

I remember a man named Davis who had a boat there about 1906. I worked for old man Captain Davis and Harry Starbuck. I didn't measure that boat, but it was about 60 or 70 feet long. You go down in the river and take a boat up and measure it and you get it in the water and it looks like it won't be over 25 feet long and it will be 50. That boat could carry a pretty good load. It would not carry any load as heavy as a bateau which was poled on the river. It wouldn't carry no load like that at all. We put a bateau in front of it and couple them together and load the bateau down and put staves and lumber in it. I operated the bateau in conjunction with the Davis boat. We would help him out in these hard places. The steamboat would help in the easy places and the bateau would help the steamboat in the hard places. I think the Davis boat just laid there in Hinton and they shipped the engine away. I don't know what they done with it. I don't remember where they taken the engine to. I think Old Man Pack bought the hull from Captain Davis and run it a little bit up and down river as a bateau. He did not shove it. He had two motor boats, skiffs, and one right in front of the other and pulled that boat up. Old Man Pack built him a motor boat and put two motors on skiffs—on motor boats not on the Davis boat.

Q. How much of a tide did you have when you went to Radford?

A. Well, we didn't measure it.

Q. A pretty good one, wasn't it?

A. Well, it was a tide all right and we were working and going down there. I couldn't tell. We didn't measure that.

Q. You had enough tide to get over the big falls, didn't you? You had enough tide to get over the big falls that you had to go over?

471 A. We can go over there tomorrow if we were down there and take a boat. You can't because you ain't man enough to do it.

Q. How many times have you ever been over the falls of the Narrows?

A. Sir?

Q. How many times have you ever been through the falls of the Narrows in a bateau?

A. I didn't count them—several times, though.

Q. Where is the channel through that falls?

A. Channel through which falls?

Q. The falls of the Narrows?
A. Narrows Falls?
Q. Yes.
A. I don't know where the channel is. We weren't looking for the channel. There wasn't any up there. We would just go on up to Radford over here.
Q. You would go right over the falls? You didn't have to look for a channel?
A. How would we look and shoving for life? All we had to look for was something to eat, bread and meat, and work.
Q. Are you familiar with the channel in Shumate's Falls?
A. Which Shumate?
Q. Anderson Shumate?
A. Yes, sir.
Q. How far is that above Wiley's Falls?
A. That is below Wiley's falls.
Q. I am not talking about Anderson's Falls now.
A. You said Anderson's Falls, didn't he? He asked me how far it was.
The COURT. He said Anderson Shumate's Falls.
A. Anderson Shumate? You know where the Doc Shumate place is? That used to be the old Anderson Shumate farm.

By Mr. ABBOT:

Q. We want to get it down here so other people will know. We know a whole lot the rest of them don't know.
472 A. Well, there wasn't no chutes in there.
Q. You had to go through a channel to get through that?
A. Wasn't no channel there. We would go to Glen Lyn and load a boat and come down there and get a team and haul around the Shumate's Falls and load it on and come on through.
Q. Would you always do that, Uncle Andy, at Shumate falls?
A. Yes, sir; every trip I made we would do that.
Q. You have never poled a boat through Shumate's falls?
A. Poled it through there?
Q. Yes, pushed it through?
A. We pushed it through there, but coming back we would go to Glen Lyn and unload and haul stuff around there below Shumate's falls and put it on back there.
Q. Do you remember what happened at that falls when you were boating Mr. Crockett up the River?
A. Well, sir; let me tell you I can't remember anything like that at all—what happened. If you had been along you wouldn't have knowed. You wouldn't know at all.
Q. Maybe not.
A. You would have been like me—work. We didn't know what happened.

Q. Was Jim Smith on one of these boats?

A. Yes, sir.

Q. He was on the second boat?

A. I don't know whether it was the first or second. I told you I couldn't remember what boat he was on, but he was on one of the crews that went up there.

Q. That went up where, Uncle Andy?

A. Up to Radford. There was one boat that went on through to Radford and the other turned around, the one you said went to Glen Lyn that you all tried to get me to tell a lie there.

Q. Were you on the boat that went to Radford?

A. I went to Radford; yes.

Q. Did Jim Smith go to Radford?

473 A. No, he didn't go there.

Q. Did two boats go to Radford?

A. No.

Q. Two boats started out, didn't they?

A. And we doubled, I told you, after we got over at Glyn Lyn.

Q. Where at Glen Lyn did you double?

A. Mister, I didn't measure it or keep count of it. Do you know where the Tony ferry is?

Q. That is right at Glen Lyn, isn't it?

A. That is right.

Q. Is that where you doubled?

A. Tony's Ferry, yes. It comes over—do you know where that bridge is at the N. & W.? Well, that wasn't no bridge there. The N. & W. was just put there.

Q. You don't mean to say the Norfolk & Western has got a bridge across the river at Glen Lyn, do you?

A. No, sir; I said the Virginian got one in there. There are two divisions, the N. & W. and Norfolk & Western, right at Glen Lyn—the Virginian road and the N. & W. comes right in there at Glen Lyn, one on one side of the river and crosses the river right there at the tunnel, comes around the mountain from over at Bluefield, and comes through there and comes across the river at Glen Lyn where the Power Company has got a plant.

Q. That is the Virginian that comes across there?

A. Virginian comes across there and the N. & W. keeps up the right-hand side.

Q. And you say it was there that you doubled over?

A. Right along there at Tony's Ferry.

Q. And from that point one boat went to Radford, and you were on that boat?

A. On that boat; yes, sir.

Q. Don't you recall, Uncle Andy, that the boat hung up down there at Shumate's falls and the furniture was hauled from
474 there by wagon to Glen Lyn and shipped away on cars?

A. No, sir.

Q. Did you take the furniture out of either of those boats at Shumate's Falls?

A. No, sir; we doubled over there and hauled them up over Shumate's Falls and taken them on to Glen Lyn and transferred from there and went on to Radford up here. There is no bridge there. There ain't on that map there. There is one up at Radford.

Q. How long did it take you to get to Radford, Uncle Andy?

A. I told you we didn't keep count of it, mister.

Q. Was it a week?

A. I couldn't tell you. I said we didn't keep count of it.

Q. Can't you tell things you don't keep any account of?

A. I could tell you a lot of things I kept account of, but I ain't going to do it.

I kept count of the boats I used on the river around Hinton, and from Hinton up to the Mercer's Salt Works, but I didn't keep count of any one else's boats. I testified in Hinton when I gave my deposition there that there used to be as many as eight and nine boats down there at a time, but I didn't keep count of them at all. I was looking after my own boats. Between eight and nine bateaux were the most that ever operated on the river at the time. I had boats of my own. I couldn't tell you how long it took us to get up to Radford. When we got there, Radford was a pretty rough-looking place, rough people, and rough-looking country, too; mountains, rocks, and cliffs. This was before the Appalachian was building the dam.

Q. Did you see any railroad bridges when you went up there?

A. Wasn't any in there at all on the N. & W.

Q. You didn't see any railroad bridge across the river on that trip?

A. How could we see a railroad bridge in there, when we got to Radford there was three or four come in there.

Q. You didn't see any until you got to Radford?

A. They come up and down there, coal yards up and down the river, before the N. & W. used to haul it back about Union, wagons hauled it.

475 Q. What was that they hauled?

A. Coal.

Q. From where?

A. From up at them mines.

Q. You mean the Parrot mines and McCoy mines on the river?

A. Mines; I don't know whose they were.

Q. When you went on this trip from Crump's Bottom to Radford, did you go under any railroad bridge or trestle?

A. No, sir; it has been so long I don't know. We might have went under bridges and everything. We couldn't take time to see what it was.

Q. Have you any recollection as to how many; might you have gone under as many as four of them?

A. We didn't count them, in the name of the Lord how could you count them when you get in a place like that riffle, could we take time to count bridges and railroads up there, we had to be looking out for something else, if we had we would have done better to have laid on the bank and walked.

Q. You don't mean to say you encountered any riffles?

A. Did you ever see any eddies up there?

Q. I thought it was a pretty placid stream to take two loads of furniture on a boat to Radford?

A. Which?

Q. I say I thought this was a smooth stream.

A. Pretty rough I tell you.

Q. Where were these eddies, do you remember any of them?

A. No; after we left Glen Lyn we did keep count of nothing, didn't have time to keep count of nothing.

Q. You didn't see any railroad bridges?

A. How in the name of the Lord could we keep an account of that and go down there and shove like dogs, how could we count the bridges and things? Mister, we couldn't have done it.

Q. I thought you might have peeped up on some occasion and caught a glance of some of them, but you didn't have time to do that?

476 A. No, sir.

Q. Did you see anything going up that river you remember?

A. Geese and ducks and birds and things like that and skiffs.

Q. Did you see Walker's Creek?

A. I never paid no attention to Walker's Creek or John's Creek, either.

Q. Did you go by any cities or towns on the way up there?

A. No, sir; we had supplies on the boat and went on.

Q. I suppose when you got to Radford they put a blindfold on you?

A. That wouldn't amount to a penny on a boat. You think they could come down there blindfolded running New River?

Q. How long did it take to run it?

A. I didn't count the minutes or hours.

Q. You said you didn't move the furniture on either of those boats until you doubled over at Glen Lyn, I believe?

A. I said we taken it to Glen Lyn where Tony's Ferry is, on two boats.

Q. No furniture had been moved on any boat.

A. Might have been before I was born, I don't know. I couldn't keep count of it.

Q. I am talking about that trip?

A. We didn't take time, mister.

By the COURT. He wants to know when you all started up the river with the two boats of furniture, did you change or switch the furniture until you got to Glen Lyn?

A. We put it on one boat and sent the other one back.

By the COURT. Did you do that before you got to Glen Lyn?

A. We taken one load around Shumate Falls.

Q. Why did you just haul one load around Shumate Falls?

A. Enough of us in there to shove it.

Q. Did you take off each boat or first off one boat?

A. I didn't count them I told you.

477 Q. It is a fact that wagons came up to Shumate Falls?

A. They can now.

Q. Couldn't they when you boated fertilizer down the river?

A. A man lived there, old man Anderson Shumate; we would go to him and get him to help us around there.

Q. He would help you around there with a team, wouldn't he?

A. Yes, sir.

Q. Uncle Andy, did you ever boat up into East River?

A. No; we went as far as Shumate at Glen Lyn, never were up in East River in a boat.

Q. Never up there?

A. Have you ever been up there?

Q. Not on a boat, but I have been up there.

A. Well you ought to know without asking me.

Q. I want you to tell about it. Can you get up East River with a bateau, get up into the river or on up?

A. I never did try it.

Q. You have gone up there to get stuff, haven't you, at Glen Lyn, at the station?

A. Yes, sir; Ould's store used to be there at the mouth of East River.

Q. What do you mean by the mouth of East River?

A. Where it empties into New River, like the Kanawha empties into the Ohio, that has a mouth, ain't it?

Q. What I asked was if you were ever up in East River—don't you recall Ould's store in there?

A. We went up to the mouth of East River to where Ould's store is, you know where that is, right there by the side of the station, now the N. & W., since I have been up there was put through there and I ain't been back in a boat since.

Q. You took your boat and loaded it in front of Mr. Ould's store when you would get stuff from Glen Lyn?

A. We went right below the store, a ford right below Ould's store.

478 Q. You mean the old ford going down the river?

A. The ford going over to Ould's store at Glen Lyn station used to be there.

Q. How far up into East River would you take your bateaux?

A. Along about Ould's store at the mouth of East River.

Q. Up where the old road coming down East River was?

A. Now they may have changed since I was there, could I tell which way it come, we went in there I told you.

Q. Do you remember the road coming down East River, Uncle Andy?

A. Which road?

Q. The wagon road, the road that crossed the East River right there by Mr. Shumate's house, and one road went to the left, you went on around the mountain?

A. The house was away down this side of Glen Lyn and the road come up New River past that place.

Q. You did not go up into East River with your bateaux?

A. We went to the mouth of it at Ould's store. You know where that is without asking me.

Q. Is that near a brick house?

A. I didn't look to see if it was a brick house or what, Ould's store, you know whether it was made of lumber or brick.

Q. I asked if it was near a brick house on the left bank of the East River?

A. I can't remember that, it might have been a plank house or weatherbearded, I don't know.

Q. When was the last time you were at Glen Lyn?

A. Been about twenty or thirty years. Last time I was at Glen Lyn was when I went over in Franklin County.

Q. When was it you moved Col. Crockett on a boat?

A. I can't tell you the day and hour at all. It has been away back yonder, a right smart back, thirty-five or forty years. We didn't keep the date.

479 By the COURT:

How old were you?

A. I was a young man, going on seventy-three now, and take it thirty-five or forty years ago, I would have been a pretty good man, wouldn't I?

Q. Uncle Andy, how old were you when you were married?
A. Twenty-four years old.
Q. Was this before or after you were married?
A. This was before—no, after; I married after that, because I went on there to get cattle from over here at Christiansburg.
Q. And was it anywhere near the time you were married, within a year, or two years, after you were married?
A. After I was married?
Q. Yes.
A. It was after I was married. I can't remember the years.
Q. How many years would you say?
A. I can't keep account of that.
Q. So you have no idea except you were a young man?
A. That is what I was, a young man and very good one, too.
Q. By a young man, what do you mean?

By Mr. THOMPSON:

It seems to me this is going beyond the bounds of cross-examination. He says the best of his memory he did it as a young man, and I appeal to the Court.

A. Can I remember everything? No, sir; I cannot.
Q. I just want to get your idea as to what a young man is.
A. How old are you?
Q. I am pretty young—I am forty.
A. Then you ought to know without asking me.
Q. Were you forty at that time?
A. I don't know what age I was. I didn't keep the date of it at all.
Q. You might have been anywhere from twenty to fifty when this happened?
A. No; I wouldn't say that long.
480 Q. Can you tell us just about how old you were then?

By the COURT:

He said it was thirty-five or forty years ago.

A. Yes, thirty-five or forty years ago.

The witness on Redirect Examination testified as follows:

Q. Mr. Medley, could you give an estimate from your best judgment as to the number of trips you took up to Glen Lyn and back?
A. No; we didn't keep account of them, Mr. Thompson. How could we keep account of them and working hard? We were working for a man and getting $3.00 a trip, and how could we keep account?
Q. I believe you stated it covered a period of from six to eight years?
A. Yes, sir.

Q. Have you any idea how many times a year you would go up there?

A. We didn't keep count of it.

Q. Did you go in times other than springtime?

A. No; only in the spring to Glen Lyn to get fertilizer.

Q. Did you go at any other time to Glen Lyn?

A. No; we didn't.

Q. I understood you to say to counsel you would go when an order came?

A. We would, but it wouldn't be no winter, you know, would take a boat up there loaded down enough to supply them in cold weather.

Q. In answer to a question from counsel I understood him to ask you how many times you went through Great Falls, and I would like to know what you meant by that.

By Mr. ABBOT:

I said Big Falls at Narrows.

A. You mean the Shumate Falls?

Q. Is that what you understood by the Big Falls?

A. That is what he said.

Q. Did you understand him to mean Shumate Falls when he said Big Falls?

481 A. That is what I understood him to say.

Q. Did you go through Shumate Falls on a boat?

A. We didn't walk over it.

Q. Did you go through on a boat?

A. Yes, sir.

Q. Going upstream?

A. Yes, sir.

Q. Coming downstream did you go through Shumate Falls?

A. We didn't carry the boat around there.

Q. Just answer my question.

A. We certainly did.

Q. Were you always able to come down Shumate Falls in a boat?

A. We never missed it coming down through there, we would have a load on there and have to unload it, put it in a boat down under them falls, go up and get a load, and get old man Anderson Shumate to deliver it, take his team and go and haul the stuff from there and come on in.

Q. You loaded the boat below the Falls?

A. Put it back on the boat below the Falls.

Q. I don't understand; did you run the boat empty below Shumate Falls and then load?

A. We come to the Falls and unloaded and hauled it around and put it back on the bateau.

By the COURT:

When you got to the Falls you ran into the bank and unloaded?

A. Yes, sir.

By the COURT:

And then ran the empty boat through the Falls and reloaded?

A. Yes, sir.

Q. How many boats did you say you built?

A. Bateaux?

Q. Yes.

A. About twelve or fourteen.

Q. Did you run them on the river?

482 A. I helped run them and build them. I had five of my own.

H. A. STARBUCK on direct examination testified as follows:

I reside at Hinton, West Virginia. I am 52 years old and was born at Lansing, West Virginia. I have lived in Hinton about 48 years. I am and have been a locomotive engineer for little over 30 years on the C. & O. Railroad and have been on that road all the time.

I have seen all kinds of boats on New River—bateaux, skiffs, motorboats, and steamboats. I have seen boats operated by steam engine or gasoline motor.

I have heard of a boat owned by a man of the name of Davis. It was built in what we call a flatboat style with a cabin, two side wheels, and a steering wheel. I judge it was 50 or 60 feet long, and about 11 feet wide or something like that. I don't know when I first saw the boat. I helped my father put machinery on it but I can't say what year. My father run a machine shop and foundry. I don't remember the horsepower of the engine exactly, but it was close to 30, possibly a little less or a little more.

I went on the boat with Mr. Davis in 1907, but I had been on it some time before that. How long before I don't remember. I run the engine and machinery part of the boat for Mr. Davis for a season or two, I don't remember. After I ran the boat for Mr. Davis I taken charge of it.

I got the boat from Mr. Dunlap and was to pay a dollar a day for the use of the boat on the days that I run it. I ran it in 1907 and I believe the year before that. That boat was run at least three and maybe four years on the river. I am not positive about it.

They taken the machinery off the boat and shipped it, I don't know where to. The hull was laid up there a good while and I don't know what became of it. They took the machinery off because there was nothing up there to boat after the roads opened up and they quit cutting staves.

The principal things hauled by this boat were staves and lumber. I hauled staves for the Nabb Stave Company, but our contract was made with a man on the wharf named Alf Atkins. We got those staves at Sulphur Spring Branch, Bull Falls, and
483 Indian Creek. I suppose it was 25 miles up to Sulphur Springs up to Mr. French's place that the boat was run. Going upstream we would have a passenger or two maybe and someone might have some groceries or something for the store we would take up on the trip. Some of the groceries were carried to a store at Bertha and some for True and some for Crump's Bottom. Coming down we carried staves, principally, and also other lumber. Staves and lumber is about all we boated.

We used a bateau, shoved it ahead of us and we generally brought five or six thousand or more on a bateau and on the gasoline boat. It depended on how long the staves had been cut and seasoned. We would go two days on the trip to Sulphur Spring Branch. We would go up and load and come back the next day. We would not stop coming down unless we had a passenger or a little freight. The reason we stopped running this boat was that they got to hauling in wagons and the roads were better and there was not enough hauling to pay to boat the freight. There are no staves cut on that river now at all that I know of. The stave business is practically gone.

Referring to the photograph marked Government Exhibit No. 13 which you have handed me, that is the Davis boat in the picture, the boat which I ran, and in the picture the man in the window down below where the people are standing under deck is Bill Flippen, the man who run the machinery ahead of me a while.

I knew of quite a few smaller boats on the river. There were lots of motor boats and lots of skiffs and bateaux. I have had two or three motor boats myself. They ran from 20 to 25 feet in length, and I had one 30 feet long which my father and I built. I didn't build the hulls altogether. I built the machinery and installed the motors. I would say that I have installed the machinery in 7 or 8, 5 or 6 motor boats on that river, or something like that. We used this boat for excursions generally to Bull Falls on Sundays and holidays. The engine on that boat was of a horizontal type. Fairbanks and Morris gasoline engine, as I remember.

I made money running that boat so long as stuff lasted. I made a living but didn't get rich at it.

The witness on cross-examination testified as follows:

I installed machinery in 7 or 8 boats on that river. Some
484 of them were used for pleasure and some for shoving bateaux up the river with loads. They would range from 20 to 25 feet in length. The boats they later used to push the bateaux

up the river were of the same kind. They shipped the machinery off of the Davis boat, I don't know where, and I don't know what become of the hull. We stopped using boats because we run out of something to boat.

I said I went up to the stave yard on Mr. Estil French's place at Sulphur Spring Branch. We had no trouble getting through Bull Falls on that boat. We wound through it. We would snub a big rope to a tree above the Falls and then had a windlass that pulled the boat, helped with its own power.

We generally had one to three bateaux. We would use the power on the motor boat and winding with the rope. They would get on the top of the Falls and tilt up and throw your power out of the water and you would have to catch it 'till the wheel would take hold.

Q. Uncle Andy Medley ran on the bateaux in connection with the boat, didn't he?

A. He worked on the boat for me a time, and also Mr. Davis.

Q. On the bateaux in front you mean?

A. He was one of the crew, the whole thing.

Q. I understood when you got to the shoals the bateaux men would shove and help the whole thing along and when you were in good water the motor would take it on very comfortably?

A. No; that was only in certain places where the bateaux being so long would throw your wheel out and maybe if you were in a hurry you would catch it with a pull. It wasn't absolutely necessary only on Bull Falls.

By the COURT:

I believe you said when you ceased working for this boat called the Davis boat that later after that you had several smaller boats yourself, you and your father did, you used those for pleasure boats.

A. No; I used them for awhile shoving a bateau but the majority of mine was used for pleasure or hauling passengers, if someone wanted to go up the river I would take them. I didn't have any schedule.

485 J. H. DICKINSON on direct examination testified as follows:

I was 73 years old last February. I was born in Giles County, Virginia, four miles below Glen Lyn on New River, and lived there about 25 years, or until I was about 25 years old. I remember something about the crops that were raised on the farms in that section at that time. We raised tobacco, wheat, corn, and a little of all kinds of crops.

Prior to the time when the C. & O. came through Hinton we would haul our tobacco to Dublin. I was a very small boy and

went on a trip there. We hauled the tobacco to Dublin with horses and wagons. A trip to Dublin and back from Glen Lyn would take a little less than a week.

After the C. & O. Railroad came to Hinton we taken our tobacco to Hinton, usually on boats called bateaux. They were 60 to 70 feet long and seven or eight feet wide, and were of different sizes.

Q. How much tobacco did you haul on one of these boats from Glen Lyn to Hinton?

A. I never done no boating myself, but I guess they would taxe 8 or 10 thousand pounds on them boats.

Q. Do you recall what the boatmen charged you to transport your tobacco down there?

A. I think from Round Bottom it was 25 cents a hundred.

Q. Do you recall when the Government made channel improvements in New River?

A. I was at home when they were working there cleaning out the river.

Q. State whether or not you saw boat traffic on the river between Hinton and Glen Lyn prior to the time the channel improvements were made?

A. Yes, sir.

Q. How far up the river from Hinton did the Federal Government improve this particular section of the river?

A. It seems to me like they stopped pretty close when they got in Virginia.

Q. Do you know where Wiley's Falls is?

486 A. They cut through Wiley's Falls, a channel was cut through Wiley's Falls, and they done some little work on above there. At that time they were camping on our place, that was their headquarters:

Q. Where was your place, in West Virginia or Virginia?

A. That was in Virginia.

Q. Do you recall anything about the stores along the river between Hinton and Glen Lyn in those days?

A. There were stores at Round Bottom and one at Salt Well; there were sores in different places.

Q. Did Mr. Shumate have a store?

A. Yes, sir; that Salt Well store was the Shumate store at one time.

Q. State whether or not there was a store around Glen Lyn or in that immediate vicinity?

A. Yes, sir.

Q. Do you recall who ran that store when you were a boy?

A. Yes; I remember, it was John Shumate.

Q. State to the Court how these storekeepers got their merchandise?

A. They got it hauled to them in boats mostly.

Q. From where?

A. From Hinton.

Q. Do you recall what the bateaux hauled down from the Glen Lyn territory to Hinton, other than the tobacco which you have described?

A. They hauled wheat, lumber, and various things. Them bateaux would carry wheat, and corn, and they have taken corn to the mill from Crump's Bottom in the boat.

Q. When you moved from the vicinity of Glen Lyn down the river, where did you move to?

A. Crump's Bottom.

Q. That is between Glen Lyn and Hinton?

A. Yes, sir.

Q. Do you recall when the Norfolk & Western constructed its line in the vicinity of Glen Lyn?

A. Yes, sir.

487 Q. What have you to say about any supplies or material being hauled on New River in connection with the construction of that railroad?

A. They had a lot of boats and they boated their supplies from Hinton up there to the Shumate Falls near Glen Lyn, and they would haul them from there a mile or such a matter on wagons.

Q. Can you tell us how many boats were engaged in that particular traffic?

A. I think five or six or four or five.

Q. What about the weight of the load that was brought up there of that material?

A. They had them loaded pretty heavy coming up. I wouldn't tell just how many pounds they would fetch up there. Of course, that would depend on the water, the more water they had the bigger load they would carry.

Q. State to the Court whether or not you have any knowledge of boats going through Shumate's Falls?

A. Yes; there has been boats went through Shumate's Falls.

Q. What have you to say about how far up the river the boats have gone?

A. There was a fellow at Radford that made a little boat and he ran that down to Crump's Bottom and stayed there two or three days and then went on into Hinton.

Q. Was that a power boat or a keel bottom boat?

A. It was run by power. He stayed at Crump's Bottom, and I don't know what became of the boat, but he went on to Hinton.

After the Government completed the channel improvements the boating equipment that they had went to Hinton and I suppose was disposed of. I was on one boat that went down there. I got on the boat at my father's place in Virgina. A lot of boats came down there and stopped and then all the boats went down the river. I reckon there was a dozen or more boats in that fleet that went down the river. I was on something similiar to a bateau.

The boats wasn't all alike.

488 It required something like a week to take a load of tobacco from the vicinity of Glen Lyn to Dublin and return. It wouldn't take all day to take a boat load of tobacco from the vicinity of Glen Lyn to Hinton. I think it took them boats nearly a week to get to Hinton and get loaded and come back. They brought back supplies for the Norfolk and Western up the river. They were loaded down pretty heavy. They would bring to the stores just what the merchants wanted, including shoes, sugar, coffee, and things like that.

They used to boat the good timber down the river in boats. They rafted the rough timber. I don't think they wanted the best timber to get in the water and they carried it on the bateaux. Cross ties were rafted two or three hundred in a raft.

Q. After the Government put a channel through up as far as Wiley's Falls, state to the Court whether or not you observed any effect that it had on the river traffic?

A. Yes, those boats could make it better after they cut those channels and they could take bigger loads.

Q. Could they run at low stage of water?

A. Yes, sir.

The witness on cross-examination testified as follows:

I was a very small boy when I hauled tobacco to Dublin. I had done some hauling over to the C. & O. or over to Lowell or Talcott. I got some fertilizer over there a time or two.

Q. When you were working on the Ace place, do you remember when you were a young man that you worked on a farm of your father's, a little small farm, and said you made 17 acres of tobacco up above Round Bottom?

A. That is the place they called the Ace place. I made a crop of tobacco there.

Q. Is that where you used the fertilizer that you got from Lowell and Talcott?

A. I don't know that I did then. I hauled fertilizer at different times. I hauled fertilizer from Hinton and I hauled fertilizer from Glen Lyn.

Q. By wagon?

489 A. Yes, sir.

Q. The tobacco you raised and sent down the river you put on the bateau at Round Bottom?

A. That is just where we put our tobacco on, about Round Bottom.

Q. You say the toll was 25 cents a hundred from there down to Hinton on the tobacco?

A. That is my recollection, that that is what they charged, about 25¢ a hundred.

Q. When you were testifying about the traffic on the river from the vicinity of Glen Lyn, you were referring to the shipping of tobacco from Round Bottom, were you not?

A. Well, yes, sir; there in Virginia, we would haul our tobacco down to the Round Bottom, or two or three miles below that.

Q. You would put it on a wagon and haul it down there and ship it by water?

A. Yes, sir.

Q. You said that the stores along New River were supplied by bateaux. You do not mean to create the impression that John Shumate's Store at Glen Lyn was supplied that way, do you?

A. I didn't say John Shumate's store, but I will say the Shumate Store at Salt Well.

Q. Before that channel was cut through Wiley's Falls, you had to have a right sharp tide to get over it, didn't you?

A. I never was no boatman myself, I don't know as much about the river in regard to boating as some of these old boaters do, but then they would go over the falls.

Q. But there had to be right much water in the river?

A. Well, it would take some water.

Q. Uncle Jim, when was it the Government boats went down the river, when you went on one of them?

A. How is that?

Q. When was it the Government boats went down the river, when you went on one of them?

490 A. That has been a good many years ago. That was when they quit working on New River, and when the boats went down I was a boylike.

Q. Was it the year of the Big Flood?

A. I don't know, I ain't positive about that.

By the COURT:

Q. Do you remember the year of the Big Flood?

A. Yes, sir; I remember the flood.

The witness on redirect examination testified as follows:

Q. You spoke of transporting fertilizer down the river from Glen Lyn?

A. We always hauled fertilizer on a wagon, I always did.

Q. When you lived at Round Bottom?

A. Yes, sir; I used to haul it on a wagon.

Q. After you moved to Crump's Bottom, how much farther down the river is that?

A. I suppose it would be about 12 miles.

Q. When did you move down there, do you recall the year, or how old you were?

A. I was twenty-four or twenty-five years old.

Q. State whether or not you got supplies at Crump's Bottom from up and down the river?

A. Yes, sir.

Q. On the boats?

A. Yes, sir. The boats run regular. If you wanted anything from Hinton they would bring it for you, and if you had anything to ship, they would take it down for you.

D. L. LANE on direct examination testified as follows:

I am 48 years of age and have lived at Hinton or in the county close by all my life. I am familiar with New River in that vicinity.

I have seen boats on New River ever since I can remember. I would say since I was eight years old. As to when I saw the last boats on New River, they have got boats there now, ferryboats, skiffs, and boats like that.

491 Q. When was the last time you saw any boats hauling merchandise or similar products up and down the river?

A. I don't know that I have seen any in the last ten years.

Q. Continuously during the period then of about 40 years, you have seen traffic on New River, have you?

A. I will say thirty years.

I believe the bateaux which I have seen on the river were 62 feet long and 9 or 9½ feet across the top. I owned and operated a pair of boats myself from 1906 to about 1914, and done hauling for other people altogether. We hauled lumber, staves, tanbark, pulpwood, shingles, sand, and merchandise, and corn and wheat. We hauled the merchandise upstream to those stores. The biggest haul we made was downstream. I don't know the capacity of those boats in pounds. We would haul as high as 11,000 feet of dry poplar or pine. We would haul about 9,000 staves to a load.

Q. How many boats have you seen on that river at any one time?

A. I would say 15.

Q. Did you operate those boats all the year round?

A. Yes, sir; except when the river was frozen up and there was ice on it.

Q. Did you operate them regardless of high or low water?

A. Yes, sir.

Q. Were there any wagon roads in there at this time?

A. Very poor. There were wagon roads but they were very poor.

Q. Why was not more hauling done by wagon?

A. Because the roads were very poor.

Q. Would you stay that practically all the commerce in that part of the country was carried on the river?

A. Yes, sir.

Q. How did it happen that these bateaux stopped running?

A. Well, the timber played out and they were not hauling any timber much. There has been a little hauling since then with trucks, in late years.

I operated these bateaux from Hinton to Round Bottom and different points, including Pack's Ferry. I operated up-
492 stream as far as Round Bottom. There was a creek that came in at Round Bottom and I loaded below and above it where there was two little loading places. The creek is called Round Bottom Creek. I loaded on the right hand side going upstream. We always loaded the boat headed up the river because in getting to the river bank we had to cross the river. The channel was on the opposite side of the river or near the other side. That is, when we loaded we pushed the boat out and went upstream and crossed to the far side of the river because the channel was on the far side of the river. Then as we went out we turned the boat around and came down.

Q. Have you ever seen any motor boats on the river?

A. Yes, sir; they used to have a big motor boat up there that they pushed those bateaux back with.

Q. Where did that operate?

A. Between Hinton and Sulphur Springs Branch.

Q. How many boats would they push with that motor boat?

A. Three.

It had a gasoline motor. It would push one down and three up. I have seen some logs rafted. There was some loose logging. There used to be a pocket there and they rafted the logs down there.

Q. How many trips did you make with these bateaux a week?

A. From the upper place, we made two trips a week and sometimes three.

Q. How long did it take you to make a round trip?

A. Sometimes it would take up two days and sometimes it would take us three days, according to weather conditions.

The witness on cross-examination testified as follows:

I did this boating from 1906 to 1914. I was hauling for other people. I had two boats of my own part of the time but most all of the time I had one.

About 1910 I saw 15 bateaux on the river. They were owned by different people. I can't name all of the owners, but the Weeks boys owned two. I had two at that time, my father owned one, Surber owned one, John Bradbury owned one, Ed and Bud Lilly owned one, and some of the Merchant boys
493 owned one. I can't remember their names, but I believe their names were Cliff and Dick. Bob Craddock owned one, and A. Nabb and Company wh- ran the big stave company owned one, and they owned this other big boat which pushed them up there. There were some more boats but I can't remember the names of the owners. I did not count the boats or bateaux that were pushed up there by the big boat of Nabb and Company.

Q. Don't you know as a matter of fact, that that boat stopped running in 1907 or 1908?

A. No, sir; I don't know just what time it stopped.

EMMETT M. SMITH on direct examination testified as follows:

I am a brother of J. R. Smith, who testified here yesterday. I live at True, West Virginia, which is about five miles above Hinton up New River, right at the entrance of Bluestone River into New River. I will be 48 years old the twenty-first of this November.

I done some boating on New River with Captain Davis' boat that run with gasoline and I also rafted ties and lumber. I worked on boats on the river near about nine years. We taken some of the boats to above Hinton. I made three trips, but the longest trip to my knowledge was here to Glen Lyn. I was working for Elbert Merchant who is no longer living. He owned two boats to the best of my knowledge.

We took some groceries and merchandise and things like that up to Glen Lyn which we got at Hinton. It had been unloaded there from the train and placed on the river bank at the boat wharf, and we loaded and unloaded there. We took the merchandise to Glen Lyn and put it on the river bank where wagons could get it. I don't remember who we carried the stuff to. I remember there was a store at Glen Lyn then when we made that trip. To the best of my knowledge it was run by a man named Williams. When we returned we did not take anything from Glen Lyn, but we dropped around to Round Bottom and loaded with staves.

We also carried lumber and staves, tanbark and tobacco down stream. We made two trips with tobacco down there. On our trip to Glen Lyn sometimes there would be just little tides in

there but not so we couldn't travel it. We made those trips in the early part of the year near the spring. We
494 generally hauled about 5,000 staves on a boat. It depended upon the length of the staves. It would be 5,000 staves if they were 32 inches long, and if we got 10-inch or 12-inch or 14-inch staves we carried about 6,000 or 7,000 staves on a load.

I remember the T. H. Lilly Lumber Company and helped to load ties and lumber for them on the river bank there at Hinton near where the Standard Oil Company's place is now. That was the wharf for boats to come in.

I saw power boats on the river. There was a big boat there run by Captain Davis. It run by gasoline and had something like 20 horsepower or more. I worked on that boat and made several trips on it. If I am not mistaken that boat ran near about four years on the river.

The Lilly boys had a motor boat. Elbert Merchant had a motor boat and he fastened it on to the side of the bateau, the Lilly boys did.

I also worked for Captain John Lane who had a bateau. He hired Elmer Medley and used his motor boat to push his boat in the latter part of the year of that boating. When they used a motor they also used a pole at times when they got in a heavy chute like Bull Falls and Anderson Falls. Up where they got in those heavy chutes they would use poles.

When we went up to Glen Lyn we went through all the falls all right and we went through when we came down.

We boated staves for A. Nabb and Company which were shipped into New York. I remember that Captain Davis carried anywhere from two to three thousand staves on his boat and then he pushed a bateau that carried about five or six thousand staves.

Q. When you made these trips to Glen Lyn, were those trips made when your brother was along?

A. I don't recall my brother going on any trips at that time. I think he was off the river then.

Q. He wasn't with you on the river then?

A. No, sir.

Q. And you were boating for somebody else?

A. Yes, sir.

The witness on cross-examination testified as follows:

I was quite a young man when I did this boating to
495 Glen Lyn. I will be 48 in November. I was round about 20, I might not have been quite that old.

We did not follow the channel going up there all the way because there would be a little rise in the river and that could float the boat and keep you off the rocks. Part of the time we used the channel and part of the time we did not in going up when they carried cargoes and then we used the channel.

I did not see the Government cleaning out the channel on New River but my father worked on that. I don't know how far up the river that channel went. It went up the river as far as I had ever been with the bateau.

Q. This stuff that you say was going to Glen Lyn and that you say was loaded on the river bank, you say that was hauled away by a wagon?

A. If the wagon could get to it they hauled it with a wagon from the river bank.

Q. And that is where you put it, on the river bank?

A. It was our instructions to unload it there.

E. N. FARLEY on direct examination testified as follows:

I live in Hinton, West Virginia. I have lived there since 1906, except for a few years in the West. I am a Special Agent for the Chesapeake and Ohio Railroad Company.

When I was a little boy boats were working on New River. I know boats ran on it for 35 or 40 years. I have run boats there myself.

I am 55 years old and have lived in Hinton since 1906. I was 25 years old when I went to Hinton. Before that I lived at the east end—at True, West Virginia.

I began working on the boats in the year 1906. During the time that I worked on the river I owned two boats. We hauled lumber, staves, merchandise, and switch ties on them. The farthest up New River I ever went on the boats was just east of Island Creek. Island Creek is up the river from Bull Falls. It is near Round Bottom but downstream from it.

I have been in the lumber business and have bought and sold some lumber. I bought quite a lot of timber and lumber from R. J. Houchins and quite a little from Joe Lilly and his
496 brother, whose first name I have forgotten. I bought and sold for myself. I sold to the Lilly Lumber Company. Lumber was carried by me on the boats on the river.

There was a great deal of timber floated on the river on rafts, cross-ties, and things like that. I sold all the cross-ties that I bought to the Pennsylvania Railroad Company. They were shipped to various places on the Pennsylvania Railroad. First an inspector would come and pick them up and he would bill them out to the Pennsylvania Railroad Company. They were billed

outside the state and a great many were shipped to the State of Pennsylvania, at least, so they said.

No cross-examination.

CHARLES EDWARD KENLEY on direct examination testified as follows:

I am 59 years old. I live across the river from Hinton, at Madam's Creek, and have lived there 28 years. Before that I lived at True, West Virginia, where I was born. That is about six miles this side of Hinton. I am familiar with New River in the vicinity of Hinton.

I seen bateaux on the river and a small boat which they called the Government boat. I seen a boat that Davis made. I don't know what kind of a name they gave it. It was a pretty large boat. They called the others bateaux. These were from 68 to 85 feet in length and about 9 feet wide.

I worked on these boats. I hauled staves, lumber, pulpwood, hay, wheat, corn, and tanbark downstream. We hauled groceries and things for the stores upstream and sometimes we would have parts for the saw mills and different things like that going upstream.

The first bateau I seen was when the Government quit work and they turned them back in. The last time I saw bateaux operating was about 15 years ago. They quit working on the river because they claimed there was nothing to haul. I made my living boating on the river for about 20 years, off and on.

I went upstream from Hinton on the bateau as far as the place they called Round Bottom. There was a loading station there at that time just a little above the mouth of the creek, not right at it. When we were going down we had a side oar that pulled the oar on one side and pulled it around and down there.

497 We slipped into the stream and took the boat out to the chutes. They were angling back and forth across the river—sometimes on one side of the river and sometimes on the other side, and sometimes in the middle. Generally it was on the other side where we first got into the channel across the river before we got on the first shoals. When I first loaded the boat I crossed to the other side of the river and started down. At that point I made only two trips a week on the bateau. It took us about three days to a trip.

Q. Did you operate the bateaux all the year around?

A. Well, ice sometimes would prevent us from operating in the wintertime; sometimes we would operate in the wintertime and sometimes ice prevented us from operating them in the winter season.

Q. Did you operate during the rest of the year, regardless of whether or not there was high or low water?

A. Yes, sir.

Q. Was there any other commerce around there, such as commerce on the roads—did they carry things on the roads?

A. No, sir; not to amount to anything. The roads was in such bad shape that wagons could not get over them empty at that time.

Q. Did you see any rafting?

A. Yes, sir; plenty of that.

Q. Where was that?

A. I have seen rafting—I have seen rafts run from Round Bottom clean into Hinton, rafting ties. I have seen logs rafted from the mouth of Indian Creek and lumber and I have seen it rafted from Crump's Bottom into Hinton.

Q. Have you seen a lot of that, or just occasionally?

A. I have seen a lot of it.

The motorboat I saw there was what they call a skiff. It had a motor in it which they would hitch to the bateau to operate the bateau with the motorboat. This skiff was a flat-bottom boat with a sharp end in front. They would push just one bateau with this skiff going up and down stream.

I worked some for other people and operated the boats myself.

The first work I did was to operate for George Pack from
498 Round Bottom. The first work I did was for Mr. Rutledge, but the first work operating for George Pack was from Round Bottom. After I worked for him I worked for Wesley Serber and Mr. Ernest Farley, Lester Lane, the Bradberry boys, and Mr. Taz Rutledge, and it would be too numerous to recall them all. I owned all of one boat and part of another. I saw six boats operating on the river during the same summer.

The witness on cross-examination testified as follows:

I saw rafts of ties from Round Bottom. The ties would be laid together and poled—nailed on top to hold them together. There would be two layers of ties side by side, one tie thick. I suppose the ties were of white oak, but they made them from different kinds of wood, I don't know what kinds. I had to remain in the channel in rafting ties. The rafts had oars on each end to guide them.

Q. Could you run a raft upstream?

A. No, sir; not very handy.

When a raft was taken down from Round Bottom we had to use oars to keep it in the channel. One man at each end would operate an oar. If they wanted to get this side off [indicating] they would both pull the same way, and if it was the other side they would both pull that way and keep it in the channel and off the shoals.

The first chute is when you cross the river at Round Bottom. I don't know nothing about a ford, but I know the first chute that entered—that we entered in was just across, after loading the boat, we went across the river and entered in the chute and stayed in all the way down. We did not have to go upstream to get into the chute. It was just straight across. We couldn't go down on this side of the river because there wasn't any channel cut. Some places were deep and others were almost dry. I don't know whether there was a fishing hole in there or not. I never fished much. I think there is a deep place near Round Bottom, but don't know much about it. The channel does not end at Round Bottom. They have it all the way as far as Hinton.

Coming upstream they have walls built up along the side that go up close to the bank. Some places they would go in the
499 channel when the water was low, but they generally went along the bank with an empty boat.

There was a little store at Round Bottom on the creek, I couldn't tell you exactly where. The first store I remember there was Mr. Wick's. I think it was on the left-hand side of Round Bottom Creek as you faced the river. I think they had a landing below the mouth of Round Bottom Creek, but we landed above. That is where the staves was at that time. I suppose staves were brought right down by the store on a road going to the landing below the mouth of Round Bottom Branch.

Q. Why did they take them over the branch and pile them on that side of it?

A. I could not tell you, only those boats could get to the bank.

Q. You say that the boats could not get to the water at the landing below that landing?

A. Them boats could not get in there over the shoals—the water was not deep enough.

Q. Then why did they have a landing place there?

A. That is the reason I say they landed above, because they could not get below on account of the shoals.

Q. Wasn't there a landing place below the mouth of Round Bottom creek?

A. Some of them said, I think, that they boated there, but I never did. They said they had a landing there, but I am telling you what I did.

Q. When did you find out about the upper landing?

A. When I was boating.

Q. Why didn't you tell us about it when you testified at Hinton?

A. About the upper landing?

Q. Yes.

A. I don't remember the question being asked about what side the landing was on; I don't remember that.

Q. I don't think it was, but you did not say anything about any upper landing down there, did you? What recalled the upper landing to your mind recently?

500 A. Why, I was just thinking what place that landing was to get this stuff, and it just come to me that we—where we landed, which is right at the mouth of the creek; right at the mouth of the creek; right in the mouth of the creek is where we landed.

Q. You loaded right in the mouth of the creek?

A. We loaded almost in the mouth of the creek—just above it.

Q. Why were you taxing your mind with it? Why were you thinking about it?

A. I was aiming to give you the truth; I was just trying to get things lined up. It has been a long time, and I was trying to get it lined up.

I boated at Round Bottom off and on for a couple of years. I don't remember how many times I have been up there. I did go up there several times when I wasn't on the boat. I couldn't tell you how many times. Sometimes I would be walking and sometimes riding horseback.

I have boated staves from French's stave yard. The channel, it was not cut—the real channel up the arm there, up to the stave yard—and when we come out we went across the river to the channel; about half way above the river to the channel, when we come out. At the mouth of the arm of the river the channel is somewhere near the middle of the river. We boated there a long time. I kept no count of how long. I boated with Lester Lane. Besides myself on the boat were Lester Lane and first one brother of his and then another, I could not begin to tell you. Sometimes I would make a trip with one crew and then with another.

I quit boating along about 15 years ago, or something like that; I didn't take note of it; maybe longer than that. Most of my boating, I reckon, was done from the Mercer's Salt Works. I also boated at Bluestone. We done more boating above there than at Bluestone. I did not load at the Mercer's Salt Works. I did most of my boating from there on below. The boating business is pretty hard.

R. E. LUCAS on direct examination testified as follows:

I was born in Sommers County, West Virginia, at True,
501 and have lived there all my life. I have seen boats and boated on New River, and I have also rafted ties and logs on it. I have rafted and boated there about 15 years. It has been around 20 or 25 years since I quit. I am now 54 years old.

I commenced working on the river when I was about 16 years years old. I owned one or two boats on which I carried lumber

and staves which I sometimes got from the ferry and sometimes at the lower falls, and sometimes at Crump's Bottom—also at Mercer's Salt Works and the Sulphur Springs Branch.

When I worked as a boat hand the boat would go to most of those places. I don't think I ever went farther than Island Creek, I mean Round Bottom. I don't recollect whether or not Island Creek came in above or below Round Bottom. The place I went to upstream they called Sulphur Springs Branch.

I don't know that it had any other name. I made several trips that far. I don't know that I ever boated in any heavy timber and I never rafted any heavy timber. I rafted ties and logs from the mouth of Bluestone and down. I don't recall any above the mouth of the Bluestone.

The names of some of the men I hauled stuff for were D. M. Meadows, A. Nabb and Company, Zinie Burks, and Billy Burks.

Sometimes it was pretty hard to get over some of the places in going up and down. We took loads up the river to Mercer's Salt Works. I don't know that I taken any heavy loads farther up the river than that.

The boats I worked on were 50 feet long and 7 feet wide, and 70 feet long and 9 feet across the top.

The largest number of boats I saw working on the river at one time was 12. There were that many there for not more than one or two years. At other times there would be an average of five or six nearly every day going out.

The witness on Cross-Examination testified as follows:

I said there were 12 boats at one time on the river for what might have been a couple of years. I don't remember what years those were. Alf Merchant owned some boats and Alfred Meadows owned some. I think Alf Merchant owned two, him and another fellow, John Williams, who was a kind of partner of his. I ain't sure that I did not own any at that time. I might have owned one of the 12 boats. I owned one boat along
502 towards the last of the boating.

It was along about the middle of the 15 years that I worked when the boats were running that there were 12 boats on the river. Wes Serber and Alfred Meadows also owned boats. I can't remember who else owned boats. I owned a boat once which another fellow and I built. It was the same size as the others—50 feet in the gunwale and 60 feet on the ends. These boats cost about $150 or $200 to build one.

J. W. Reed on Direct Examination testified as follows:

I am 74 years old. I live at Hinton, West Virginia, and have been there well on to 60 years.

I was a hand on the steamboat which would at one time operate on New River in the vicinity of Hinton. It ran from Hinton to

Bull Falls. It was supposed to have something of a schedule. The daily trip was supposed to be from Hinton to Bull Falls and back.

Most anything was carried on this boat—anything that they wanted to take up and down the river, such as freight, tobacco, groceries, dry goods, staves, and hay. It carried some passengers. They had two cabins on it up above for passengers. It was 110 feet long and 35 feet wide, to the best of my recollection. It had only two decks. It run between 18 months and two years.

Q. What personal experience have you had navigating bateaux?

A. Well, I have had my shoulder skinned right sharply shoving a pole. We loaded the freight on a bateau—some of them call them keel-bottoms—and put freight on there and shoved it up the river and put on staves, lumber, hay, or tobacco, or anything else, to come down the river and come back down and bring it to Hinton to the railroad.

Q. How far up New River from Hinton did you go when you were working on the keel-bottom boats?

A. Up as far as Shumate's Falls.

Q. At that time what operation was going on in the vicinity of Glen Lyn?

503 A. Well, when I went up to the Falls I was working for a fellow by the name of Pine, L. A. Pine. He was running four or five boats, you know. I had a contract to haul groceries and stuff up to the mouth of the river for the Norfolk & Western Railroad or for the contractors that were making the road.

Q. You say the mouth of the river?

A. Well, I believe the road turned up at the mouth of East River; didn't it?

Q. Where did you deposit the merchandise?

A. At Shumate's Falls.

Q. How many boats were being used on that contract by Mr. Pine?

A. Well, I can't recall all of them, but there were four or five, maybe six.

Q. How often would you make a round trip?

A. Well, a round trip would take from three to four days.

Q. At that time, Mr. Reed, had the Government completed the channel improvement on that section of the river?

A. No, sir; not up at the upper end there, up where Shumate Falls is. They hadn't gotten through Wiley's Falls or Thompson's Mill dam, we always call it.

Q. How far up stream from Hinton had they gone with the improvement?

A. As well as I can recollect, I think they got up near Shanklin Ferry—up there.

Q. Before the Government cleaned the channel through Wiley's Falls or Thompson's Mill Shoals, state whether or not you navigated that particular shoal.

A. Yes, we shoved that before it was cleaned, before the channel.

Q. And that was the time you were going through to Shumate's Falls?

A. Yes, sir.

Q. Were you able to navigate the river at all seasons?

A. Well, yes; sometimes it was pretty bad when the water would get low.

Q. What would you do when the water would get low?

504 A. Just take what we could go with. If we had anything to go they would take what they could go with and lighten the load. Of course, they wouldn't aim to take a full load on a low stage of water.

Q. When you were transporting the supplies up to the Norfolk & Western construction operation, what would you carry on the return trip, if anything?

A. Coming back to Hinton?

Q. Yes.

A. Just anything that was to come—lumber, tobacco or staves, hay—anything that was to come down the river.

The witness on cross-examination testified as follows:

We had no trouble about the operation of that boat except that the channel was pretty swift. When we had to go in the channel we would take a rope and run up to the head of the wall. They had a wall or buoy down at the head of the wall and a big ring, and tie a rope on that and take the capstans on the boat and wind yourself up in three or four places.

All the chutes are tolerably swift, some swifter than others. I don't know that I can tell you exactly how many there were between Bull Falls and Hinton. There was one through Beach Run Shoal, right at the foot of that island, starting out from the landing. And one up through Greenbrier Shoals, one through Bluestone Shoals, just above where they started to put the dam, and one or two what they called Landcraft Shoals, and we had no more channel until we got up to above Landcraft Eddy. The next one as I recollect was what they called Barker's Notch, just about a mile and a half below Bull Falls.

I don't know much about the ones above Bull Falls. I never navigated up that way with the "Cecelia." We never got any farther than Bull Falls, with the exception of one time. One

time we went to the mouth of Indian Creek. That is the highest that that boat ever got, to my knowledge. Bull Falls is between 10 and 12 miles from Hinton. I expect Indian Creek is two miles and a half above Bull Falls.

The way we would run this rope out to the buoy that you would tie to was for some three or four men to get hold of it and walk up the wall and pull it up there. Sometimes the water was
505 running over the wall. We would run up there to the foot of the wall and have the rope read, and go right on up the wall with it. It took three or four men to take the rope up and moor it. Sometimes we could reach out there and get hold of the buoy. They had it right on the end of the shoals and they had a buoy to show you where it was at all the time and reach down and get the ring and they had to get in the water sometimes. Sometimes these walls were along the sides of the channel out of the water. They were out of the water most of the time unless there was a rise in the river. I couldn't recall how deep that channel was constructed, but it seems to me it was supposed to be 18 or 20 inches. Whenever the water got above that depth it got over the walls. The walls were just the blasted rock piled up on each side. That looked like what you call dry walls. They were just loose rock piled up in a line.

I don't remember where Mr. Pine had his store. I was never up there. He never had it at Shumate's Falls. They would come down and get the merchandise with a wagon.

Q. Where was his store? You say you never were there?

A. I never was in his store; no.

Q. Did you ever see his store?

A. No; I never did see it because we would go up there and unload this stuff and a wagon would come on and get it. The store must have been up further, the commissary, or whatever it was.

Q. In other words, you would haul this stuff to the river and then it would be hauled away to Mr. Pine's store?

A. Yes, sir.

Q. Do you remember where that construction was that the Norfolk & Western was doing, Mr. Reed?

A. Where was it?

Q. The construction the Norfolk & Western was doing that Mr. Pine was furnishing the supplies to?

A. They was building that road up there, grading the railroad up through Bluefield and up that way.

I didn't see where they were grading that railroad because we never got up to the railroad. I never got out when we
506 landed these supplies and looked around. We would unload and come right back. We never fooled around much. I don't recall whether there was a little branch coming down or not where we unloaded.

I suppose they intended to run that boat through the channel through Wiley's Falls or they wouldn't have channeled it.

Q. I said where in Wiley's Falls is the channel, in Thompson's Mill Dam?

A. I couldn't tell you. I never did go up there after the channel was put there.

Q. You never went up?

A. I quit the river and went to railroading before they put the channel through there.

Q. And so you don't know where the channel through Wiley's Falls is?

A. No, sir.

Q. Did you ever go through Wiley's Falls on a boat?

A. On a bateau?

Q. Yes.

A. Yes, sir.

Q. Whereabouts? What part of the falls did you go over?

A. Near the left side.

Q. As you go down?

A. As you go up.

Q. And there was no channel there?

A. No; there was a little notch in the place where more water run over there than any place else. You could shove the boat up through there.

Q. But you never went up there after the Federal Government cut the channel?

A. No, sir.

The witness on Redirect Examination testified as follows:

I stated on Direct Examination that I passed through Wiley's Fall on my trips up to the place where I deposited the
507 merchandise at Shumate's Falls. Wiley's Falls is below Shumate's Falls. I went up right below Shumate's Falls.

LEWIS M. SMITH on Direct Examination testified as follows:

I will be 75 my next birthday. I was born in Virginia and moved to Bull Falls on New River when I was 10 or 11, or maybe 12, years old. I lived in sight of the river on a farm for about 20 years, until I was about 32 or a little past 30. They called Bull Falls 12 miles from Hinton. After I lived there we moved to Hinton, where I have resided since. I am Constable. When I first moved to Hinton I got a job on the Chesapeake and Ohio Railroad.

I saw boats on New River during the period in which I lived at Bull Falls. They were bateaux about 45 or 50 feet long in that kind of shape (indicating with hands) and about 10 or 11 feet wide at the widest place. The bow of the boat was pointed and the boat had a flat bottom.

I saw bateaux on New River in this period of 20 years almost every day nearly. I would say three times a week. I have been on a bateau and owned one which a fellow built for me. It was 45 or 50 feet long, about the size of these other boats. The bottom of it was kind of flat but it flared out at the gunwales and had no keel. When the boat was empty it would not draw more than a foot of water. When it was loaded down heavy I guess it would draw two and a half or three feet.

I operated this boat from Lick Creek to Hinton. Lick Creek is up the river from Hinton on the right hand side, about 32 or 33 miles. You had to pass Bull Falls and then Crump's Bottom. I operated my bateau about 15 years, I guess. That was my business during that time.

I worked on other boats before I bought this one; I don't believe I can say when I first worked on a boat. I boated about five or six years before I bought one. Before that I ran boats from Lick Creek to Hinton along this same 30 or 32 miles.

During this period the boats carried wheat, corn, lumber, and staves. I don't know that they carried anything else. They would get this produce which I described from Lick Creek. Some of it would come in from Crump's Bottom and some from Bull Falls. The boats would come along and gather
508 it up and take it to Hinton.

The Mercer's Salt Works is on Lick Creek about two miles from the mouth of it where it flows into New River. During the Spanish War time they made salt there. There was farming country around Mercer's Salt Works.

There is a store at Lick Creek and one at Crump's Bottom. There was one at the mouth of Pipestem—True, I believe they called it. That is a little closer to Hinton. Joe Meadows ran a store at Lick Creek and John G. Crockett ran one at Crump's Bottom. Mr. Lawrence Meadows ran the one at True.

When my boat reached Hinton during the days before I owned one, we mostly came back empty and brought some stuff. We would bring back dry goods, tinware, and stuff for a general store to Crump's Bottom and to Lick Creek. That is about all the stores there was there.

During this period in which I worked on the boats there were boats on this portion of New River before the channel was improved. After the channel was improved there were more boats. I commenced work on the river after the channel was improved. For the next four or five years after that, I would say there were 10 or 12 bateaux operating up and down river from Hinton to Lick Creek.

One of the men who worked on the crews of these boats was Mr. J. W. Reed, who just testified. Most of the others are dead.

Some of them were Captain Thorbison, Captain Johnson, and J. A. Medley. I saw Mr. Medley here today. And also two men, colored—Smith and Charles Kenley, who was on the stand today. I also remember a man named Frazier who is living and who worked on these boats.

The capacity of these boats that I ran I reckon was 2,500 pounds or more. I ran them down to Hinton from Lick Creek. I have hauled 7,000 sawed staves on boats of this kind. Some of the staves came from Lick Creek and some from Bull Falls. Most of the staves were out of Pipestem. I have carried 7,000 staves on one boat on one trip. I had two men besides myself on one of these boats. Some of the men who operated my boat were Joe Pack and Anthony Pack, and a fellow named Frazier. I can't recall any others now.

I carried tobacco, staves, wheat and corn mostly down the river. I carried just a little stuff for the stores up the river—bacon, sugar, flour, hardware.

509 It would take me eight to ten hours to come from Lick Creek down the river to Hinton, depending upon the height of the water and the wind. It would generally take about a day and a half to go back to Lick Creek from Hinton.

Most of the boating on the river was done along in the fall, but there was some lumber and staves coming continuously. I hauled grain in the fall. The tobacco was cut and hauled in the spring. There was some operating of boats in winter when the river was not frozen. I would say the river was frozen for about three months. During that period the water would be frozen nearly solid. The winters were colder than they are now. The river froze last winter, but generally it doesn't.

I would carry 2,500 pounds or more of tobacco. I got most of it at Lick Creek and some at Bull Falls, and would bring it to Hinton at the landing above those shoals. There is a wharf there where everything was unloaded. The tobacco was put in hogsheads and barrels. There were some large hogsheads and some smaller ones. The tobacco was shipped to Danville and Richmond in Virginia. I know that because I saw the tags which were tacked on the hogsheads in the depot. The tobacco was put in the hogsheads before we moved it down the river.

I don't know of any bateaux going from Hinton to Radford, Virginia, except what I heard. I never was that far up.

Thorbison and Johnson had a boat but did not go above Lick Creek with it. I did not see any boat above Lick Creek.

I ran a bateau on this river for 15 years. During the same period other bateaux operated on the river, I would say 10 or 12 of them. The most were bringing supplies up to the N. & W. They took those supplies up there to Lick Creek for the railroad

after getting them at Hinton. They would carry picks, shovels, tools, and foodstuff.

I don't remember when I stopped running my boat, but it was after we moved to Hinton, which was in 1887. I built my boat then. I saw boating on the river about 10 years after I discontinued boating.

I saw a steamboat on the river name the "Cecelia." I could not give you the date. We were at Bull Falls yet at that time. I came to Hinton in 1887 so it was before that that I saw this steamboat. It was a tolerable large boat and operated by steam and carried store products, bacon and stuff like that. I saw
510 people on it. It carried passengers. It ran from Bull Falls to Hinton, which is 16 miles. I have seen it above Bull Falls, up above the mouth of Indian Creek. It operated on New River from two to four years, I would say.

Captain Davis also put a steamboat on New River after the "Cecelia" was there. I saw that boat which was kind of narrow and slim. I saw some passengers on it but don't know how long it operated. I don't know much about that boat. The Lick Creek I have spoken of is the one Mercer's Salt Works is on.

No cross-examination.

EVERETT W. LILLY on Direct Examination testified as follows:

I am 58 years old. My home is at Hinton. I have lived there for 36 years. I have been in the lumber business there for that time, and in that period have seen steamboats, gasoline boats, bateaux, and rafts on New River. The rafts were of ties and logs. I have seen some loose logging also there.

I have ridden on bateaux and gasoline boats on the river, the farthest upstream from Hinton I have been is above the mouth of Island Creek up at Round Bottom. I went there in a gasoline motorboat. It was a kind of fishing outfit, gasoline outfit, attached to the boat. Also in the last few years they used a gasoline motor, about running the bateaux. The motorboat which I was on was 20 to 24 feet long.

During my time in business there I had seen loading and unloading of boats on the river which carried export and domestic lumber. I have also seen boats carry produce down to Hinton and go back upstream with groceries.

I can't state just when I seen a bateau operating on the river for the first time, but it was before I went into the lumber business. They were operating when I went into the lumber business 26 years ago. I don't think I have seen any bateaux operating for 10 or 12 years. These bateaux may not have brought lumber down to me downstream to Hinton since 1920. They begin to get some produce up and down the river and come in by truck.

I would say that lumber came to me in bateaux between 1900 and 1915, a period of 15 years. It came in with pretty good rapid speed during that time. I had docks of my own there where the bateaux unloaded.

511 All the ties that came in rafts were loaded direct from the river on railroad cars and the lumber was sometimes loaded into them and sometimes it was piled up. The ties were handled from the river by an electric hoist, chain, and electric motor. I had one of these.

I was not the only person engaged in the lumber business at Hinton during this period. I don't know how many other concerns there were. There were three or four there that handled lumber in a small way. Ecomstock Lumber Company of New York handled quite a bit.

The amount of lumber that would be unloaded at my dock from these bateaux would depend on the kind. Export lumber did not have as many feet in it, possibly six to eight thousand feet, and dry lumber for domestic use would maybe be 10 to 14 thousand feet, in that neighborhood. By export lumber I mean lumber for foreign shipments. I don't remember that we exported any staves that came down the river. We handled principally railroad plank, they called it wagon plank in English.

I couldn't say how many feet of lumber a year was hauled down New River and unloaded by my dock at Hinton. Sometimes a bateau of the larger type would bring in a minimum weight of a carload, 30,000 pounds. I couldn't tell exactly how many cars a year were filled with lumber that came down the New River, but we handled millions of feet, between the period of 1900 and 1915, came down the river by raft and by bateau. Sometimes we would load from 10 to 12 cars a week.

I couldn't say what the largest number of carloads I shipped out in a year was. Possibly we would ship as much as a million feet, some years, that came down the river—I would say in the neighborhoop of a million feet, possibly a hundred cars in a year. The million feet includes only the export lumber and domestic lumber that came down New River on bateaux or was floated down stream. The million feet was all lumber that came down New River.

I have seen a steamboat on New River. I don't know what boat that was or who owned it. The last time I knew the Hobbs boys had it in charge. It was the Hodge boat.

The other lumber concerns in Hinton I spoke of had a dock, it had an electric hoist and it received ties coming down New River.

512 The witness on Cross Examination testified as follows:

I understand that this boat I have been talking about was

driven by steam at first. I wouldn't say for sure. Later on it was run by gasoline. That was the Hodge boat. I don't know how it got that name unless Hodge was the man who built it. I couldn't tell you whether there was a man in Hinton named Hodge. I can remember seeing the boat there before 1900 when I was a boy. It was just a small outfit. It might have been 60 feet long and might have been longer, or it could have been shorter. I couldn't tell you what its width was. It had wheels on both sides. I couldn't tell you if it had a wheel at the stern. I just seen it out on the river and didn't pay much attention to it. The old hull is laying over there buried up the river yet, right on the edge of the river. It is at the loading docks owned by the Hinton Builders Supply Company at what they call Avis. I haven't been there for a couple of years perhaps. It hasn't been so long since I have been down the river at that point. I couldn't tell you whether or not a guage station has recently been put in the river there. I have seen that boat hull rotting there I would say for 30 years, 1900 to 1930. I couldn't describe the boat. I used to go in it for shelter during the early part of 1900 and 1901. The Hobbs brothers used to run it some. Bill Flippen and a man named Starbuck may have operated it some. I heard that Mr. Starbuck and Harry Hobbs and John Hobbs operated it. I have seen them with it.

I don't remember that I ever heard of a boat called the Davis boat. I have seen several motors on bateaux but I don't recall just who owned them. I have seen several boats and bateaux on the river which has been under my observation pretty constantly since 1900. I have not seen nothing but this one big boat that was driven by internal power and the bateaux, small outfits, gasoline boats.

I got lumber from other places up river than New River. I have had lumber hauled into my plant by wagons. Some was hauled in there from up the Greenbrier. I have had some lumber hauled in there from up New River by wagon and have had some brought up from lower down New River by wagon. The lumber industry there came from the people deforesting the
513 country there of all the merchantible timber they could get.

I have no records with me showing the carloads I shipped away. I wouldn't say for sure whether those records have been been destroyed or not.

I have handled staves. When staves are brought down the river they are sometimes seasoned at the yard and sometimes they are shipped green. I have handled them both ways. A green stave will weigh about 4½ pounds to the foot. The staves were all different lengths. Those shipped away from Hinton were 28, 30, and 32 inches in length and over lengths, depending on the

size barrel or keg they wanted to make. The staves that were 28 inches long were of different sizes, some 3 to 6 and 7 inches wide, and I have seen them 8 inches wide. The staves would be anywhere from 3 to 8 inches in width. If you have a 3-inch dry stave 28 inches long, ¾ of an inch thick, and multiplied by 4, that will give you approximately the weight of air-dried staves. That weight might be 252/100 pounds as you have computed it. If you had a 30-inch stave, 3 inches wide and ¾ of an inch thick, that would work out the same way. A stave ordinarily would weigh about four pounds to a square foot surface measure if the stave is air-dried. Possibly some oak wouldn't weigh that and some might cross it a little.

I did not say that 8,000 pounds was a minimum car; 30,000 pounds was a minimum when we first commenced shipping over the C. & O. I said a bateau would bring down a minimum car—20,000 pounds, 15 tons. What is a maximum car depends on the capacity. The maximum capacity of some ordinary car to ship lumber in is 60,000 pounds, and it is greater for some. How much greater I don't know. The C. & O. had them up to 100,000 capacity.

If a 28-inch stave were dry and an inch thick it would weigh four pounds. If it were ¾ of an inch it would weigh a quarter less. Staves cut for flour barrels are thinner. The only staves we handled was oil barrel staves and whiskey barrel staves. Staves cut for apple barrels and flour barrels are not as thick as a barrel that will hold liquid.

The amount I paid on an average for the lumber floated down the river depended on the kind of lumber. The cheapest we ever got a boat for was $15 a trip. The cost of the lumber depended on
514 the kind of lumber. I think we used to pay about 65¢ a piece for cross ties up at Bull Falls and round in that section and it would depend on the demand during that period of years what price we could afford to pay. We shipped more cross ties away than any other kind of lumber. I included these in the million feet I mentioned.

I couldn't tell you what was the most I ever paid for lumber which I had brought down the river.

Some of the cross ties I brought down the river were 7 by 8. Eight was the standard and some were 7 by 9. I think there were about 44 feet in the 7 by 9. I guess the ones I paid 65 cents for were the standard ties. 7 by 8 was standard.

I used to pay different prices for sawed lumber. I guess I paid as high as $25 a thousand for export lumber up the river. That was not the highest price I paid for lumber within this million feet I mentioned. I have an idea that I have paid as high as $90 a thousand for No. 1 and No. 2 poplar. I got quite

a lot of that during the period from 1900 to 1915. The poplar was a small percentage of the lumber I brought down the river compared with the amount of feet in ties that were shipped out. I couldn't estimate that percentage, it would be guess work with me.

I don't remember exactly the lowest price I ever paid for sawed lumber, I brought down the river and shipped away. It might have been in the neighborhood of $10, No. 3 common. $15 would not be a fair average for lumber and ties together which I brought down the river. We have gotten as high as $2.25 for a 7 by 9.

We handled more ties than we did boards and export lumber, but I wouldn't attempt to say just what amount of each. I can't give you the average cost of that.

The witness on Redirect Examination testified as follows:

The lumber hauled in by wagon came from different places all around the section of the country near Hinton. We had a shipping yard there. None came in by wagon from as far up as Island Creek. All of the lumber up there came in by boat. It was only the lumber right near Hinton that came in by wagon.

J. H. HOOVER on Direct Examination testified as follows:

I will be 72 the 20th day of next December. I have
515 lived in Hinton since 1872. Before that I lived in Lewisburg, Greenbrier County.

There has been two steamboats on New River that I saw and I have seen bateaux running up and down it. The bateaux would not go further down the river than Hinton. They carried merchandise of different kinds. I don't know how far up the river they went.

I worked for J. P. Mills at that time. He owned a sawmill and a gristmill, and I run the gristmill, which was located in Hinton right below the real mouth of the river. Greenbrier came down one side and New River the other. It was on New River.

I remember work being done on the railroad around Hinton only by hearsay. I heard where they worked only by hearsay, also.

I shipped a thousand bushels for Mr. Mills up the river from his mill, I suppose. They said it was to go to the contractors at the mouth of East River. I don't know whether that contractor was working on the railroad or where he was working. Their camp or headquarters was at the mouth of East River. As far as I could see the grain I spoke of went up the river. It was put in bateaux and loaded by the men who worked on the bateaux under my supervision. The grain was put on these bateaux and they went up to East River as far as I know.

I saw a couple of steamboats on the river. I cannot remember how many years each one of them operated. The first one that was built there was a very large boat, something over 100 feet long and 30 or 35 feet in width, or beam, they called it, but it wasn't a success by any means. I was on that large boat as far as the mouth of Bluestone. I did not go up stream any further.

The witness on Cross-Examination testified as follows:

I don't know who the contractors were that I shipped this stuff to. The contract was made by Mr. Mills with the contractors. I suppose the contractors made the contract with the boatmen because I know we did not pay any freight. All I know is that the boats came up to the mill and got the grain and took it up the river to the place where the construction of the railroad was going on.

I don't know anything about whether or not the grain was being taken to the people who were working on the railroad bed which was graded down below Round Bottom. All I know
516 is that Mr. Mills told me that it was going to the mouth of East River, to ship it to the mouth of East River. He said he was shipping it from Hinton to the mouth of East River. Mr. Mills made the contract and I was working for him. He instructed me where to send it. I don't know who sent the boatmen down there to get it. We did not pay any freight on it.

I don't recall hearing of a man by the name of Pine. I don't say that the stuff wasn't shipped to a man by that name.

(Defendant moved to strike out of witness' testimony that part dealing with what was told him about the shipments.)

East River is at Glen Lyn. I never was up that far on the river. I couldn't tell you how far up New River East River is. I never was up that far. I never was up above Bull Falls or Bertha. I don't know anything in the world about East River.

Besides Mr. Mills I have heard those boatmen say they shipped lumber and staves in bateaux.

MARSHAL RICHMOND on direct examination testified as follows:

I am 75 years old. I was born November 22, 1860. I have lived practically all of my life with the exception of eight years about two and a half miles west of Hinton on the north side of the river. I have been there for 34 years and about 8 years I was working away.

I think it was 1871 when the first train came into Hinton on the C. & O. It came from the east. The railroad was constructed both from the east and west. My father and me was down there to move the foreman who was working on the bluffs west of Hinton. His wife lived at Kanawha Falls and I went with my father there to move her up there and the track was laid there

then on this way, but I don't know how far. The two sections coming from the west and the east on the C. & O. met somewhere about Hawk's Nest, but I am not positive. It was about 1870 I suppose when they finished the construction work.

At the time when I saw the first train there in 1871 there was only three houses in Hinton as I remember, one above the round-house and two in what they called Middle Hinton. My home was about 40 or 50 yards from the river, or something like that about.

I remember having seen boats on New River frequently. I saw bateaux or keel-bottom boats while they were constructing the C. & O. They came down stream and went as far as Sand-
517 stone Falls, which used to be Richmond Fall. That is about 7 or 8 miles below Hinton, I believe.

Q. Then what would the boats do when they got as far as Richmond Falls or Sandstone Falls?

A. They transferred their cargo, what they were loaded with, and we loaded it below the falls, possibly a mile and a half, possibly a little farther, on another bateau, but I don't know how far they taken it down the river.

Q. Do you know who had the contract for making the portage there at Sandstone Falls?

A. My uncle, Tuck Richmond, done the hauling around there.

Q. What did these bateaux carry?

A. All kinds of provisions, hay, grain, and everything, and supplies for the men.

I don't see how the supplies could be taken down into that section otherwise than by the river. There were no roads at all after you got by Sandstone Falls where we went across the river. There was no road down the river and there isn't very much of the road down the river yet.

These boats I expect were 50 or 60 feet long.

We cut timber in that section off my father's land, and Lewis Atkins and the Braggs cut a lot below us. We rafted some of the timber to the sawmill. Some we just put it in the river and drifted it down and caught it at the mills below Sandstone Falls. I expect my father and I cut 200,000 feet or more altogether.

The witness on Cross Examination testified as follows:

I reckon when they first commenced the road was in 1867. I am not positive about that, but I was seven years old then. That is when I saw these boats in front of our house on the river. I went down on one of them but I did not go down the river on boats all the time. I had no occasion to because I was not connected with the boat. On occasions when I went down the river on the boats I was just riding out.

We cut these logs that we floated down to Sandstone Falls off my father's land and Lewis Atkins' and George Meadows',
518 a mile and a half below where we lived. We lived two and a half miles below Hinton on the river. It would be four miles below Hinton where we cut a part of the logs. We cut the other part all down along the river on both sides, some down as far as Long Bottom, which is about a mile or a mile and a half below Sandstone Falls down the river. We just took those logs and pulled them out a little, then they floated themselves. We had boats below the falls to catch them and after we caught them we would raft them to the mill. We would let them go over the falls and catch them in the pool below the falls. We didn't tie them together and send them down in a raft because them falls was too rough to raft them. I wouldn't like to go over Sandstone Falls in a boat. We wouldn't raft them down there and get off and let them go over. We always unloosened them in the big eddy in Long Bottom and pulled them to the railroad side on the north side, which was very shallow on our side and they did not go through in a common tide. There is a break in the river on the railroad side and they would go through there. I recall the place called Long Bottom. We would catch the logs and pull them across there so as to get them on the opposite side of the river so they would go through the falls. They would not go down on the opposite side because the river was too low, there was a current in the river and the river or the current runs to the north side there. That is, the left-hand side of the river as you go down. It turns to the left side. We just put the logs in the river single and caught them when they got below the falls.

In response to the question "Where were those houses at Hinton you were talking about?" there was one house in Hinton out next to the railroad where the road used to cross until they built that overhead bridge. There was a log store out there and one down next to the river. Both of those houses were in what was until a comparatively recent time known as Avis. There were no houses at all in what was known as Hinton, that is, in the former city limits of Hinton, until they took in Avis and then those two houses would have been in Hinton. Hinton and Avis used to be separate.

519 J. W. GRAHAM on Direct Examination testified as follows:

I have lived in Hinton, West Virginia, 35 years and in the county all of my life. I was interested in a mill on New River with my brother at Sandstone. We got the logs for that mill up the river above Sandstone on New River. Up the river two to

six miles above Sandstone, I would think. We would float them down to the mill.

I have seen boats on New River around Hinton. The first boat I saw was built somewhat on the order of a river steamer, and later on there was another boat built more on the order of a flat boat. I saw the first one well on to 50 years ago, probably 45 to 50. And the next one I saw 28 or 30 years ago. The last one was made on the order of a ferry boat and propelled by a gasoline engine. I couldn't give you a size; but probably it was 10 or 12 feet wide and 40 or 50 feet long. That boat operated on the river two or three years, maybe longer, I couldn't say. I rode on that one boat on just one trip.

I was only directly connected with the mill at Sandstone two or three years, but I was around with my brother a good deal in the meantime seven or eight years or more than that, and during that entire period I got logs from up the river which were floated down the river.

No Cross Examination.

524 W. L. BURKS on Direct Examination testified as follows:

I reside at Hinton, West Virginia, and have lived in and around Hinton all my life. At present I am helping my brother in the Sheriff's Office—Deputy in the Sheriff's Office. I am 58 years old was born five miles from Hinton. I am familiar with New River and have seen it often during my lifetime.

I was in the lumber business in and around Hinton for 25 years. At first I was associated with my brother, Z. V. Burks. He is here today, although he is not in the court room. I first went into the lumber business with my brother on New River possibly in 1910 or 11, somewhere along there. I was with him part of the time and part of the time I was in the business alone. I stayed in the business for 20 years.

Part of that time when we had operations up the river we transported the lumber down by river. We manufactured lumber. We had sawmills all through the counties adjoining Summers County but the one my brother and I operated was near Warford, which is 12 miles above Hinton on New River. Warford is the post office for Bull Falls. We did not have the sawmill
525 At any other point on New River except at Warford. I think we operated that sawmill for three years, or something like that. When we did not have the sawmill we handled lumber from other points, other than the river. During that period we bought and sold lumber occasionally but not much.

We had the sawmill three or four years up the river, I believe, from 1910 or 11. In connection with the sawmill we boated and rafted lumber down the river from Warford to Hinton. We

would get our timber in the mountains at Warford before it was sawed. We sawed the timber back in the mountains but we would put it on the boat at Warford with wagons.

We hauled the lumber on boats because the haul was too long and too expensive to use wagons. The boats we used were called bateaux and were about 8 feet wide, straight and narrow and about 50 to 60 feet long. The bottoms of the boats were round. The boats were sort of half round. It usually took about 4 men to operate them. We hired the boats and did not own them ourselves. I have ridden on these boats occasionally but did not make a practice of doing so.

We shipped by boat to the Lilly Lumber Company, which was located in Hinton, and to the Richard B. Baer Company, located at Baltimore, and to Holger A. Coppell. I am not sure where Mr. Coppell was located but I think it was in Philadelphia. When the lumber was brought to Hinton it was placed on board railroad cars. The unloading place at Hinton was at what we called the hold-up track where the Hinton Builders' Supply is. It is on the river bank there in what was known as Avis at that time but it is Hinton now. I saw some of the lumber loaded on railroad cars which I shipped down. I would say that practically all of the lumber I shipped down was loaded on railroad cars—at least 90 percent.

I would say that during this period I shipped 3 or 4 million feet of lumber down New River to Hinton. The lumber consisted of pine, oak, and some hemlock.

I saw other boats on the river during this period. Some of these carried lumber and some carried tobacco—big hogsheads of tobacco—down to Hinton. That is about all I think of now that come down the river. I have seen groceries and merchandise shipped up the river in bateaux. It went to some of the stores along the river. One store was at Warford and one at
526 True. There was another store between True and Warford but I don't know whether the owner boated his merchandise or not.

The boating of lumber was done mostly in the summer. There was some boating of lumber done in the fall or winter. When the river was frozen up we were unable to do any boating. I think I remember a couple of weeks or a similar period in the winter in which the river was frozen. I have known the river to be froze longer than that but not during the time I was working. I have operated boats in the winter on New River.

I know some of the men who sold lumber, bought and cut timber or operated boats on the river or furnished our firm with timber during that period. I knew J. A. Medley, Alf Merchant,

a boatman, Will O. Farley, who manufactured some lumber or had it manufactured, L. G. Neely, who was in the lumber business, J. O. Petry, a boatman, W. H. Barton I don't remember; B. B. Trail, who, I think, shipped some lumber down the river, Will Peters, who also shipped some down the river, T. H. Lilly. C. C. Lilly I don't remember. T. H. and E. W. Lilly were wholesalers. They were the men in the Lilly Lumber Company I have spoken of.

I knew Fred Gore, J. J. Anderson, and T. B. Ballard. Fred Gore manufactured lumber which was boated down the river and so did J. G. Anderson and T. B. Ballard.

During the 20-year period in which I was in the lumber business in some way or other all of these men were in the lumber business and did boating. I don't know that all of them were in that business at the same time that I was. With the exceptions mentioned, I knew them all personally and saw them operate boats.

There have been lots of sawmills up there. Farley had one. The products of the mills were brought down New River to Hinton either on boats or in rafts. I have seen lots of rafts on the river.

The witness on cross-examination testified as follows:

I didn't own or operate any of these boats personally. My shipping point was at Warford, mostly above Bull Falls and partly below. True is about 5 miles above Avis, right at the mouth of the Bluestone. Warford is 12 miles above Avis and just above Bull Falls. That is where the store was at Warford. There is no store there now.

Q. Mr. Burks, counsel for the other side read you a list of names and asked you if they were lumber operators. You
527 don't mean to say they were solely engaged in lumbering operations, those men whose names were read to you by Mr. Williams a moment ago?

A. No; I don't say they were all solely engaged in that, but they did do the work, manufactured or had manufactured it and boated it and rafted it down the river.

Q. Weren't a lot of those people farmers up the river?

A. Why, yes.

Q. And those who had a boundary of timber would get a sawmill to come in there and saw it up and dispose of it?

A. No, some of them owned their own mills.

Q. Some of them?

A. Yes, sir.

Q. But not all of them by any means?

A. Well, I don't remember about that, and I don't know that I would know for sure about all of them.

Q. All you meant to say was that these people whose names were read to you had shipped some lumber down the river; is that correct?

A. All that I named had shipped lumber down the river; yes, sir.

Q. And one of two of them that were mentioned to you were boatmen—for instance, Medley?

A. Oh, yes, they wasn't lumber.

Q. And some of them were rafters, people who brought you rafts?

A. The people who worked on the boats usually ran rafts down the river.

Z. V. BURKS on Direct Examination testified as follows:

I reside at Hinton, West Virginia. It has been my home practically since I was about 18 years old. Before that I resided on New River at the Mouth of Bluestone. I am 66 years old. I came from Hinton here this morning by automobile. I think we took the shortest route; we tried to. Our speedometer showed the distance as 109 miles.

I first went in the lumber business when I was about 20
528 years old. At that time I owned the mill and sawed for my father. W. L. Burks, who just testified, is my brother, I think I am 8 or 9 years older than he is.

I think he and I were first partners in the lumber business about 1906. My part was to manage the mill and the woods, that is, to see to the cutting of the timber and getting it into the mill. My brother did the selling and getting of the timber to market. The first milling I did with my brother was right at Hinton and then I went to Tom's Run, a creek that runs into New River near Bull Falls, 10 miles from Hinton.

When I was in business for myself I have gone above Bull Falls for lumber. The highest point up the river that I loaded lumber was the mouth of Round Bottom Branch near the Virginia line. There was a tree about 200 yards from my loading place and it was said to be a corner of Virginia and West Virginia. The tree was upstream from my loading place.

When I was working with my father he hired the boats and I only manufactured the lumber. I floated the timber down as logs or lumber. The mills I had with my father were on New River. The first one was on Tom's Run. The second was on Lick Creek, which is farther up than Tom's Run and about 16 miles from Hinton.

The boats we used in boating this lumber were bateaux of different sizes. Most of them were about 60 feet long. The gunels were from 50 to 60 feet, making the total length about 70

feet. There were a few small ones on the river too. I don't know that there were any larger ones.

The capacity of my father's mill, that is, the one I operated, was from 7,000 to 10,000 feet a day. I operated this mill mostly through the spring and summer seasons. When I was operating the mill we ran it at about its capacity every day that we sawed timber. During the time I was with my father I estimate that we sawed from 300,000 to 500,000 feet per year. I wasn't with my father all the time from the time I went into business until my brother came in. When I first went into business with my father I owned a mill and contracted sawing timber for him. He owned the timber. This continued for about two years. Then I went into business alone and probably continued about 10 years more until my brother came in, making 12 years that I was in the lumber business; in all, before my brother came in with me.

When I was operating the mill for myself the annual
529 production was about the same as when I was with my father, that is, about 300,000 to 500,000 feet a year. Probably two million feet of this lumber of my own went down the river on boats when I was in the business by myself. That covered the whole period of 10 years but I wasn't on the river all that time.

This lumber was shipped to Hinton where I sold most of the lumber and staves to D. M. Meador, but a good many of the staves I sold to A. Nabb & Company. I was cutting some staves along while I was working lumber. We would saw poplar, pine, basswood, and wood of that kind into lumber and the white oak and best chestnut oak into staves. We would saw one at a time. The mill wasn't of a capacity to operate both the staves and lumber mill at the same time. I don't remember that I cut any staves while I was associated with my brother. I did cut some while I was operating the mill alone. I sold those staves to A. Nabb & Company and to D. M. Meador, who contracted with the Standard Oil Company.

These boats carried loads upstream. They used to carry merchandise for the merchants along the river and I don't know what it was but Captain Arbison boated some steel to Glen Lyn, it was said. (Defendant moved to strike out what witness had heard.)

He lived with us. I seen the steel on the boat but he said he delivered it to Glen Lyn. I don't know as he said what the steel was for.

The boats coming down the river carried grain, hay, tobacco, and farm products, besides lumber and staves.

I was five years old when we moved to the mouth of Bluestone, and this old Captain Orbison owned the boats then and had them there when I saw them and I saw them from that time on on the

river until he went away. Then other people had boats there until the last boating was done, which I think was in 1914. Captain Orbison had two or three boats on the river at a time. Alf Merchant and Jim Merchant also had keel bottom boats on the river. I don't know how many Alf Merchant owned but he operated boats for a number of years. I think there were as many as 10 boats at least operated at one time on the river above Hinton.

I saw a steamboat on the river at Hinton on New River and at the mouth of Bluestone and Bluestone. The name of the boat was "The Cecelia." I don't know just what year it was that I saw this boat. I was rather small boy then. I think it was over 100 feet long. It came to Bluestone and stopped at the
530 mouth of the Pipestem. I don't remember if they unloaded any freight or stopped to let off a few passengers. Then it went back out into New River and started up the river.

Q. Have you ever seen any boat other than that on New River, that is driven by gasoline or steam?

A. Yes, sir.

Q. When or about when?

A. About 1887 or 1888. My father and some others, I don't know who the other stockholders were, but it was a stock company there, that built a rather flat boat, the front part of it, as I remember, was about ten feet wide and forty-three feet long, then it dropped off to about five or six feet wide, and a wheel on each side behind these shoulders off the wide part of it.

Q. Where did that boat run, if you remember?

A. Just around close to Hinton there.

Q. What did it do, what was the purpose of the boat?

A. I really don't know what their intention was when they built it.

Q. Did it carry passengers or freight?

A. Yes; they carried some passengers, but I don't know they ever carried any freight, I don't remember that.

Q. Do you remember a Captain Davis?

A. Yes, sir.

Q. Do you recall any boat that was known as the Davis boat?

A. Yes, sir.

Q. When was that, about when?

A. That was later, it was after this, I don't know what year.

Q. Did you ever see that boat on the river?

A. Yes, sir.

Q. Going up and down?

A. I have seen it just around in the water there near Hinton. I don't know that I ever seen them attempt to go up the river above Hinton.

Q. Have you ever seen motor boats on the river?

A. Yes, sir.

531 Q. When and where?

A. Well for several years before they quit operating bateaux they used them to push bateaux up the river and down.

Q. Do you recall how far up the river you have seen one of these motorboats pushing bateaux?

A. I seen motorboats pushing bateaux as high as Lick Creek.

Q. Has the lumber business quieted down on New River?

A. Yes, sir.

Q. What has been the cause of that?

A. The main reason is there is no timber. The timber is cut out. Might be a few small patches, that could not be bought at the time the mills were operating up that way.

The witness on Cross Examination testified as follows:

I couldn't say but I think I was along about 13 or 14 years old when I saw that boat loaded with steel at the mouth of Bluestone. It was long steel something like on the order of eye beams for a derrick or shovel. There were some three or four pieces of it and they seemed to be very heavy. Two lengths of these pieces were about the full length of the boat I seen it on. I don't know how long that boat was but the boats that Captain Orbison owned were from 60 to 70 feet long. An eye beam is a broad piece of steel crossed with a "T" on each edge. I don't think it was a rail that was laid for a track.

Q. You said you thought it was for a derrick, didn't you?

A. At the time I seen this and heard them talking about taking it to Glen Lyn, or they was taking it to Glen Lyn, I didn't think much about that, I didn't know much about derricks then, but since I am older I have thought about it, and thought it could have been something of that kind.

By Mr. Abbot. We move to strike out his answer as to hearing them talking about taking it to Glen Lyn, as hearsay.

Q. Did he have anything else on that boat, beside the three pieces of steel you mentioned?

A. I don't remember of seeing any other freight at that time.

I lived at the mouth of Bluestone until I was about 15 or 16 years old. I don't remember my exact age at the time we
532 left there. I don't think of any way to fix the date definitely. I think I was older than 8 and I don't think I was 15 years old at that time. I might possibly have been about 9.

I couldn't state how many pounds of merchandise I saw in any one bateau going up the river.

Q. Did you ever see any empty bateau going up the river?

A. Yes, sir.

Q. That is the way they customarily went up, wasn't it?

A. I don't know I understand your question.

Q. I said they customarily went up the river empty, did they not?

A. When they were boating one way down the river they went up empty, if they had nothing to haul upstream, they went up empty.

Q. If any of the three stores up there wanted a little stuff it would be loaded on the bateau and brought up?

A. Yes, sir.

Q. It is not a fact by any means the bateaux were hauling loads up there every time they went up the river?

A. No, sir.

Q. It was just a matter of supplying two or three stores?

A. Yes, sir.

Q. And those stores were small country stores, were they not?

A. Yes, sir; and they would also bring up anything a farmer had along the river.

I don't know what happened to that steamboat my father was interested in. The machinery was finally taken off of it and it was just let lay there. It operated just a short time. They didn't have sufficient power to operate it. It would go downstream better than up.

The witness on Redirect Examination testified as follows:

I don't remember that I ever saw coal hauled on New River in boats. We used wood as fuel to make steam for our sawmills. I never knew of coal being hauled on New River except a sack or two to take to a blacksmith or something like that.

533 The witness on Recross Examination testified as follows:

When we came from Hinton here this morning we left Hinton on Route No. 3 and got on to Route No. 311. I don't remember to just what point we came from Hinton on Route No. 3. We came through Alderson, Union, and Salt Sulphur. We probably left No. 3 at Salt Sulphur. After Salt Sulphur the next point we came to was Peterstown, or Rich Creek, or Catawba. We did not come by the Narrows. We came through New Castle and then went by Sweet Springs. We went down the valley from Union to Sweet Springs and then over by Catawba to Sweet Springs. I believe I said Salt Sulphur but Sweet Springs is what I meant.

By Mr. WILLIAMS. If Your Honor please, in accordance with the order of presentation of the oral witnesses, we now want to read the Radford depositions first. Your Honor will take judicial notice of the fact that Radford is in your District and within 100 miles of this Court.

By Mr. ABBOT. As a matter of conserving all the time we can, it is agreed, if Your Honor please, between counsel on both sides

that the defendant objects to all leading questions asked in the depositions and all answers thereto, and the record may state that this is by agreement of counsel for both sides, so that we will not be interrupting the reading of the depositions.

By Mr. WILLIAMS. We consent that they may enter objections to all questions they consider leading questions.

By Mr. ABBOT. Also hearsay testimony and that sort of thing, all objections of that kind.

534 GORDON A. FARMER

Plaintiff introduced in evidence the deposition of Gordon A. Farmer and offered in evidence certificate of Clerk of Corporation Court for the City of Radford, Virginia, certifying to the death of Gordon A. Farmer of Radford, Virginia, and introduced this certificate as marked for identification "Plaintiff's Exhibit No. 16."

As recorded in the above-mentioned deposition, the witness testified upon Direct Examination as follows:

I was born in Montgomery County somewhere between here and Snowville. I don't know just where. I will be 89 years old the fifth day of next month. I was born in about three or four miles of New River, I suppose. I have known New River since I was about five years old—ever since I could recollect anything. I live here in the town of Radford right in the west end and have been living here for about 32 years. I have lived in this town longer than that.

Q. Do you recall ever seeing anyone do any work on the New River channel?

By Mr. ABBOT. We object. Counsel is continuously leading his witnesses.

A. Yes, sir; I know when the Government cleaned the channel out up this river here.

When I saw them they were at work up above the upper end of Dunkert's Bottom, at the upper end of Have Howe's place, at the falls up there. It is just a little piece above there, just past the first islands up there. I suppose it would be three miles above Radford on the river.

Q. What do you understand by my question?

A. Well, I just understand that you wanted to know something about the people cleaning out this channel, the Government cleaning out this channel.

535 Q. No, I want to know how far up the river Dunkert's Bottom is from here?

A. Well, there's Cloyd's farm—maybe you know something about that. Well, I suppose it is something like three miles, at least three miles or more.

I don't know exactly where Reed Creek empties into New River, but I know where Peek Creek comes in. That is the creek that comes down through Pulaski. I don't know how far up the river it is. I never run up and down the river much, and don't know exactly how far it is. It is up there a right smart piece. I don't remember exactly. It's right close to Newbern. It goes down through that road that goes up to that ferry and you cross Peek Creek. It, the creek, comes in above Towe's Ferry and below the Linkous Ferry—between the two ferries.

Q. What was the Government doing on the river?

A. They seemed to be just drilling out rocks and busting out a channel. They was all working in the water. I didn't stay there but a few minutes while they were working—a half hour or something like that. I just went down there to see what they were doing, see the work. I never had saw it. They passed up the river here, and people told me they was working here. I lived up in Pulaski then—two mile this side of the river.

By Mr. ABBOT. We move to strike out so much of the answer as states what people told him.

I am referring to the County of Pulaski. I never lived in the town.

There was some keel-bottom boats on this river. I would just see them passing up and down the river. I don't know what they was made of. I saw them above Ingle's Ferry. I lived up and in sight of the river. They was good long boats. They pushed them up there with poles and had oars on them and pulled them back down the river with the oars, and pushed them up with the poles. Had three men to a boat.

I have seen a good many keel boats on the river. I don't know how many. I know of some—I know of a good many but I don't know who they belonged to. Dick Jones is the very man I am talking about that had them boats. He had three or five, I don't remember just exactly the number he did have. I have only seen coal brought down in the boats. I never was in them. I
536 don't know what was in them.

Q. Couldn't you look at them and tell without getting in the boats?

A. I just saw them passing up and down the river. I was way off from them. I lived three or four hundred yards of the river and they was still doing that for a while, but they ceased doing that in my knowledge. They ceased. That was before they built the line of railroad from Pulaski up the river.

Q. Was that the Cripple Creek Railroad?

A. Yes, sir.

Q. That ceased after that?

A. That ceased before that commenced.

Q. Have you ever seen any logs floated down the river?

A. Plenty of them; yes, sir.

I could not give you an estimate of the amount of feet of lumber there would be in the rafts. I saw a great many rafts and rafted ties down there myself from the Earhart place at Dunkert's Bottom. I had ties rafted. I cut the ties out up there. I bought the timber and hewed the ties out and brought them down to the river and hired people to bring them down New River for me. I have forgotten whom I hired to bring them down. They were all niggers and they are all dead. That has been over 50 years ago.

I didn't see no lumber in the keel boats that came down the river. They were too far away from where I was. I suppose there was lumber boated down here after this town commenced building down here but I couldn't know nothing about it. I knew people brought lumber here in rafts and keel boats too but I don't know who they was or nothing about it. I know there was lumber unloaded down here and hauled out in this town but I don't know who brought it down, or how it was brought down. I wasn't in sight of the river after I moved here.

I have never seen any pleasure boats on the river at all except there was one built here by Mr. Jim McWayne and Walter Dudley. They built that boat and put a gasoline engine on it and I think that is what it was built for—they said it was. They tried it over these falls and it couldn't go up. They kept it here a while and I think they got it on a tide or four or five feet and took it
537 down to Hinton and sold it. That is the only thing I saw or heard of in that way.

(Defendant objected to the statement of the witness as being hearsay evidence.)

I don't have no idea in the world how far up the river logs were rafted from down to Radford. They used to buy them over at New River Bridge. General Wharton had a small saw-mill over there and he bought the logs and cut them up and sold them. I don't have no idea of how many or nothing about them. Whole lots of them came from above Dunkert's Bottom, way above there.

The witness on Cross Examination testified as follows:

I didn't go down the river on the pleasure boat I mentioned a minute ago. I didn't know nothing about going down river on it. All I know about it is what people told me. I didn't see them built it. I have seen the boat but they say Jim McWayne and Walter Dudley built it. That is all I know about it.

I did have something to do with guarding New River Bridge during the Civil War. I stayed on that old bridge and like to froze to death many a night. I guarded the bridge during

the war just a year before the war ended. It was the last year of the war that I guarded the bridge. I did not see any use made of the river that year by boats.

Dunkert's Bottom is on the right hand bank of the river as you go up. It is on the other side of the river from here—on the left bank as you come down. It is not two miles up to Dunkert's Bottom from the mouth of Little River. It is about two miles from the upper end of it. Dunkert's Bottom is about a mile long or a mile and a half, something like that. I saw these people working at the upper end of that. That is the only place I ever saw them.

I have forded New River with a horse or a horse and wagon hundreds of times at five or six different places. I forded at Ingle's Ferry many and many a time with two and four horse wagons and on horseback. I have forded it at Moore's Island, at Dunkert's Bottom and at Smith's Ford below Towe's Ferry, way up the river above Howard's Ferry, at the mouth of Reed Island.

Dick Jones had some boats before the channel was cut in the river. I saw those boats when I was first married and was living right in sight of the river a mile above Radford at the Zull place. That is a little this side of Little River, a half a mile. I was married in 1868. It was about 1869 and 1870, when I seen these boats. I lived there two years right in sight of the
538 river. I had by business to tend to and would just see the boats going up and down the river. That is all I know.

I never saw any boats after that time. I never seen no boating at all after the channel was cleaned out. I was not living at the Zull place when the channel was cleaned out. I moved away from there and have been away from there 67 years.

The witness on Redirect Examination testified as follows:

Concerning the guarding of the bridge in 1865, the Yanks came in and burned that bridge, about the last of March in 1865, I think. It was at the time they made that raid across the mountain and we got across the bridge and come over here and looked back and saw one side of the bridge burning. I commenced watching the bridge in about 1864. I was in the army. I didn't join the army until the second year of the war.

Q. So boats could have been going up and down the river during the war?

A. Oh, yes; they could have been, but they wasn't, I don't think.

Q. You say you don't think?

A. I don't think they was.

Q. Why?

A. I didn't see no boats.

Q. All of the men were out of this part of the country then, weren't they?

A. Yes, sir; everybody was gone.

I don't know who burned the bridge, whether it was the Confederates or not. I didn't see them.

I didn't ford New River in high-water time. We just guarded that bridge night and day on account of somebody might set it afire. I forded the river on horseback and in wagons at all times of the year, winter and summer, and all kinds of times but not when the water was high. It couldn't be done then. We forded it only in low tides. When I forded the water was sometimes up to my saddle skirts in some places but in low tide in the summer time there were some places you could ford where the water wouldn't be above the horse's knees. The winter tides generally would be higher and deeper.

539 Q. You spoke, in answer to questions from counsel, of seeing boats here close to New River. State whether or not you ever saw any of these keel boats when you were at Dunkert's Bottom?

A. No, sir; never saw none after I first told you about when I was first married. I left that river there. I lived there two years and moved away and never seen them any more.

Q. That was sixty-seven years ago and you didn't see them because you moved away?

A. That was it. I moved out of sight of the river.

The witness on Recross Examination testified as follows:

I was born up here somewhere between here and Snowville in Montgomery County. I didn't know how long I lived at that place. I don't recollect living there very long. When I first remember I was about five years old and lived up where Little River comes into New River, just this side. The railroad bed goes right through the place where the house was. I lived at that place just a little bit. I was a five-year-old boy. I wasn't more than three or four or five when I moved away. I went off a mile or so from there away from the river until I was about 13 or 14 years old—two or three miles from the river and we moved back to the river when I was about 13 or 14 years old.

I have been knowing the river pretty well since that time. I have been pretty close to it. I have lived within a mile and a half of the river. I never lived more than eight miles from it, for about four years. During that time the river was frequently under my observation, I imagine.

MRS. HETTIE D. HELVEY

Plaintiff introduced in evidence the deposition of Mrs. Hettie D. Helvey, and offers in evidence certificate of physician

marked for identification "Plaintiff's Exhibit No. 17," concerning her incapacity to appear in person to testify.

As recorded in the above-mentioned deposition, the witness testified upon Direct Examination as follows:

540 I do not live in East Radford, Virginia. I live across the river. I came over here because I was sick and am staying with my daughter, Mrs. Nina Salmons. My home is over in Pulaski County across the river. I will be 69 years old the first of September. I was born about five miles this side of Blacksburg in Montgomery County, right on what is now known as the Cloyd farm. At that time it was called the Pepper farm. My father's name was Charles Franklin Dudley. I lived with him in the early days. He bought the ferry here between Radford and the Pulaski side of the river, here at Radford. It was known as Hurt's Ferry. We were supposed to have a quarter of an acre on this side of the river. That is the Dudley Ferry now. When we moved there, there was already boats there and we bought the boats with the ferry and my father had to build a boat a couple of years afterward—a flat bottomed boat—to carry wagons and horses in. It was 50 feet long and I don't think it was over 14 feet wide. I think he always bought his timber, his plank, 15 feet long and made it 14 feet. He built more than one, I don't know how many. He used one for his ferry. We only had one boat at a time. That was just to go from one landing to another, and to ferry across.

I knew General G. C. Wharton and recall a trip with him on this river. On September 13, 1878, we had a terrible freshet, the largest I ever saw on New River, and we went up on a boat on a picnic which General Wharton and his wife gave to the Sunday School at New River. The New River Sunday School was a mile above Radford up on a hill above the New River Depot. We went on a bateau, which some called a keel bottom boat—a round bottom boat, just to haul things on. It was 65 or 70 feet long. Colored men worked on it when they were working on opening a channel in New River. I think General Wharton had something to do with it, superintendent or something. General Wharton had these men come with this boat and take us up New River on this picnic. I guess there were 40 or 50 on this boat. I couldn't tell you how many. It is four miles from New River, they tell me, to Ingle's Ferry and I don't remember how far it is but it is not more than a mile to the mouth of Little River. We went

541 to Ingle's Ferry and up Little River a piece—so far that we could not turn around and had to back down the river. We had dinner there. It rained all day or all afternoon and we didn't have games. I couldn't tell you exactly how long it took us to go from where we started near Radford up to the scene of

the picnic. I don't remember just what time we got on the boat. It was sometime after breakfast and I had gone a mile from the ferry. I guess the time we were to start was nine o'clock but we were a little late. We got up to the Ingle's farm and come up a real hard shower and General Wharton decided we would all have to go over to some tobacco barns. He took us there and we got very wet. Then we had to wait to get dried before we could eat dinner. Then we came back to New River that afternoon. The only motive power we had to drive the boat was men pushing it and then we drifted down the river with the current but they poled the boat so we could get on faster. That was on Saturday.

That bateau was used by men in connection with the channel on New River. I lived here then in a house near the ferry. I do not recall the men making that channel. I never saw them working at it. This boat which I took up to the picnic that Saturday started from New River. General Wharton owned the mills and everything there. When I say New River, I mean the bank of New River, not any river depot. The depot is a quarter of a mile or more above the river there. The boat started on the picnic about a quarter of a mile below the New River Depot. The landing was just above the end of the New River Bridge.

Q. You rode on one of those keel-bottom boats on another occasion, did you not?

By Mr. Arnow. I object to counsel leading the witness.

A. Yes, sir; my father and myself went up to the mouth of Little River with some men by the name of Flannigan, hauling some lumber down the river in one of those keel-bottom boats, and we went up that way, you know, and we didn't come back on the boat, we went up to the mouth of Little River, and we got out on the Pulaski side, the mouth of New River was on the Montgomery side. We walked up to my Uncle's; he lived in what they called the Dunkert Bottom.

There was no one in this bateau that time but the man who poled it up. I don't remember exactly what time in the
542 morning we started from our ferry. We got up there by noon, and got noon dinner there that day. We came back on the train. We went on to Dublin, and visited there. This was the trip I made to Dunkert Bottom. I think the Appalachian people have bought all that land now. I have heard that.

Q. Do you recall this bateau hauling lumber?

By Mr. Forbes. This question is objected to as leading.

A. Yes, sir.

I don't know whether they had to go up Little River to get the lumber or if they got it just along the river. I don't know where the sawmill was that was sawing this lumber. They hauled two loads of lumber that I know of.

I have not seen boats hauling material on this stream between these points I mentioned in the last 20 years. Before that they used to haul their corn from the Horse Shoe, which is over on the Pulaski side opposite the farm where I was born, the Pepper farm. It was exactly the shape of a horse shoe. They called one the lower shoe and one the upper shoe.

They hauled their corn to General Wharton's mill, which was up at the bridge where it is now. I have seen them hauling it. My mother went down on one trip. She went down to what they call Lover's Leap. It is the place that Mary Draper Ingles came to when she came home from the Indians. It was about half way to Blacksburg. My mother got on with the children at our ferry. The boat was a bateau.

I don't know how many bateaux were operating on the river then. They just disappeared out until there wasn't any at all. Finally the use of them was abandoned. I don't know exactly what dates those boats carried these articles. I don't know whether I have seen a bateau on the river since I was married.

Q. When were you married?

A. 1889, and I don't think I have seen a bateau since then, but they operated up till then, a few now and then.

Q. From your marriage, going back, do you recall them from your girlhood or what time?

A. Back toward my girlhood. I was only eight years old when we moved to the ferry.

Q. How old were you when you were married?

A. Twenty-two years old.

543 Q. So during that period of fourteen years you recall the bateaux operating?

A. Yes, sir; and I never saw but one with an engine, a man by the name of Hodge.

Q. Do you know his first name?

A. No, I don't.

Q. What kind of engine was that?

A. I don't know, a little engine that puffed and made a noise, and he used to drive it down by our house. he never went down the turn of the river because there was falls down there.

By the turn of the river I mean below Radford. I don't know what falls those were. They always called it Castle's Island, down below where the power house is. I saw this boat with a few passengers going for a trip. I didn't see it haul anything.

I never knew of this bateau hauling anything except that they used to haul coal from down about where the Parrot Mines are. They are below Belspring. We call it six or eight miles from Radford across our country roads. I don't know where they hauled that coal to.

Two of the men that ran the boat when we went on that picnic was drowned when they was hauling coal down there. The boat went over the Big Falls and four men were in it, a white man by the name of Dotson and Mr. Sifford and two of the colored men that run the boat we was on that day was drowned when the boat went over the falls.

Q. State if any grain was hauled on these boats?

By Mr. ABBOT. This question is objected to because leading.

A. Except what was hauled from the Horse Shoe up to General Wharton's Mill.

Q. Do you recall where the lumber was secured for building your house?

A. We bought the house already built.

Q. Do you recall a house being built there near you, of lumber being hauled down the river to Dunkert's Bottom?

By Mr. ABBOT. Objected to as leading.

A. Not that I know of. I went on the boat up Little River and walked up to Dunkert's Bottom. They were hauling that to Mr. Flannagan's. I don't know how far down the river it was.

544 I think they built a barn for Mr. Flannagan.

Q. Where was his place?

A. Down near the Horse Shoe. He owned the Horse Shoe.

The witness on cross-examination testified as follows:

The names of those colored men who were drowned were Chap Meyers and Andy Meyers. They lived close to my father. They had a brother Bill. I don't know that he was drowned on that trip. Dotson was drowned but Sifford swam out.

Q. Mrs. Helvey, you said you know of two loads of lumber brought down the river on bateaux to your father's ferry?

A. No; that was people that moved down the ferry, the loads of lumber was going to Flannagan's. I had come up on one of the boats and I think that was the last load they had hauled. I think they were building a barn for Mr. Flannagan down below the tower down here on New River.

Q. In your examination in chief you said they hauled coal down about the Parrot Mines?

A. They hauled it from there; that was where it was mined.

Q. Did you ever see them haul any coal from there?

A. No; I didn't see them haul any. I just knew of these people drowning, and one of the men that swam out was a school friend of mine.

Q. That was a boat loaded with coal?

A. Yes, sir.

When I lived at the Pepper farm my father raised grain, wheat, and sheep. He farmed in general. He shipped his grain by wagon

over to Christiansburg, that was our nearest station. We just had the flat boats. The wagons went backward and forward over the river down there.

The witness on Redirect Examination testified as follows:

My father operated a ferry right down here at East Radford. The ferry hauled all kinds of machinery, cattle and sheep, merchandise, and everything they drove on the road. There was lots of wheat hauled but that was on the flat-bottomed boat, the ferry boat we owned. We never owned a bateau. I don't know they did much shipping on the trains of these things which were hauled across my father's ferry. The New River Depot was closer
545 than it was to haul to Radford for the people in the county that raised food stuff, and over in Montgomery County we had a central depot. It is Radford now.

LUCY CALFEE SMITH

Plaintiff introduced in evidence the deposition of Lucy Calfee Smith and offered in evidence certificate of physician marked for identification "Plaintiff's Exhibit No. 18," concerning her incapacity to appear in person to testify.

(NOTE.—This deposition was taken at the home of the witness, on account of the witness being ill.)

As recorded in the above-mentioned deposition, the witness testified in Direct Examination as follows:

I was chistened Lucy Smith. I am 79 years of age, I reckon. I was born on this farm just a very short distance. There was no town at that location. The farm was near Allisonia and owned by the Calfees. I have always lived in Allisonia, which is on the river bank. I live just up the road right near the river.

Q. Did you ever see any boats on the river at Allisonia?
A. Yes, sir.
Q. What way were they going?
A. Up and down, too.
Q. What kind of boats were they?
A. Keel bottom boats everybody called them.
Q. Have you any recollection as to how long those boats were?
A. No, sir; I couldn't have judged them.
Q. Did you ever see anything on the boats?
A. Yes, sir.
Q. State what you saw?
A. I have saw produce.
Q. What do you mean by produce?
A. I have saw corn and wheat and stuff shipped up and down the river.
Q. Did you ever see any eggs or things of that kind from off farms?

A. They brought eggs up the river, there was a store
546 where they took things and a good many men come down about there.

I recall that the store was just above Allisonia about a mile right where the creek runs into the river. That is the place called Little Reed Island. I have been in that store. I have seen boats go up there and saw them put the goods in there but I don't know that I was ever right there and saw them put the goods in there, but I saw the goods go up there. It was a country store. I understood the goods came from Central down here, because what makes me think so, there was people who come from Central up there who worked in the lumber, and they would buy things, get things off of these boats and always looking forward to the boats coming up, Overstreet was the name of the people. Lee Calfee was the name of the man who ran the store.

I have seen lumber go downstream on the boats. I have seen some farm produce go down on the boats, at least from where I was that is what I thought it was, and sometimes they would stop at the ferry and sometimes probably buy something, some of the country people come and bring them something they wanted to sell or ship.

I could not just say how often I would see these boats. They come up nearly every week for several weeks at a time and they would miss maybe a day or two and come again. I was very small and can't say. I don't know how old I was when I first saw boats up there. That was as far back as I can remember.

I remember a place called Clark's ore bank, about half a mile from where we lived from the river. The bank contained iron ore. I have seen iron ore carried on these boats. I don't just know where they were going. They shipped so many things up and down the river, I don't know. The boat crossed the river and come to the opposite side and I thought went to Mack's Creek Furnace and some of it I think come down the river to where the creek ran into the river.

I went to school at Mack's Creek, and was at the furnace there. They was working at the furnace and it seems to me once I know I seen them making pig iron, or else at Boone Furnace above where I lived. I just can't recall. I can't remember if I saw them put the pig iron on the boats.

547 The witness on Cross-examination testified as follows:

I am 79 years old. I have lived with Mr. Calfee right in Allisonia until recently when his health gave out. That is the place at which I was residing during the time about which I have testified.

I testified that there were keel-bottom boats that went up to the store which was at the mouth of Big Reed Island. They went up the river that far but I reckon that the store was a half-mile or more up the creek. The store was run by Mr. G. L. Calfee and his brother. He owned a large farm above Rich Hill.

I don't know why they would haul corn and wheat from Central Depot 30 or 40 miles down the river to this Calfee's store. I just saw that they had such on it.

Q. Isn't the occasion you refer to when they were working on the channel in the river a short time?

A. I don't remember much about that; I remember hearing talk about it, but I don't remember.

Q. Can you approximate to all the years you saw this grain taken out at the Calfee store?

A. No, sir, I can't do it, but there are citizens around there that can.

Getting up by Allisonia they had to go up the river right where the mill is. Some places there were deep and some not so deep. I have crossed there many times. It is a place we used to ford on horses and in wagons that came out right at the mill. It was a very good ford, I reckon. It was tolerable deep in some places. I have no idea when this grain which I referred to was taken up there.

Q. It is only your supposition it came from Central Depot?

A. I heard it did, that they brought it from down here, but one thing that kept the boats down here a heap, everything when they come down was going to Central, you know.

There was a little mill near Calfee's store, not worth anything. It was a little gristmill that ground a few bushels a day.

548 I don't know whether there was occasion for hauling wheat up to Calfee's store or not. There was a mill there and they took some wheat for fee and rye, too, I know. The mill was right at Calfee's store where Little Reed Island runs into Big Reed Island. The lumber hauling was mostly down the river. They made rafts. I can't remember how long that continued. You know I was a child and not much interested in that. I can't tell you just how much, but several different years, I think.

Q. You have a vague recollection about them rafting logs?

A. Yes, sir, they rafted logs down there.

They rafted logs down Big Reed Island and also Little Reed Island. Rafting logs was sometimes a very common practice in there when there was wet weather.

I don't know why they hauled wheat up there from the mill down here at Radford. I would see people go up there with wheat. I don't know if they went to the store. I don't know

why they would haul corn from Radford to Allisonia where corn was raised, but they brought produce up there for their boaters. I suppose they ate the wheat and corn and sold it at the store.

I have testified about them hauling ore from Clark's ore bank that is situated up the branch about a mile from the river in the direction of Draper's Mountain. They would haul the iron over the river at J. W. Clark's ferry. That is a different ferry than Calfee's ferry. I think there was a ferry where they would boat over but I don't think it was a freight ferry. It was a private one.

Q. The Radford Iron Company would haul that ore across the river and take it in wagons to where Hiwassee is now?

A. I think they took some that way and took some in boats.

Q. But when they would take it in boats they would unload it on the opposite side of the river and haul it across to the ferry, would they not?

A. No; I think they had their own boats. Now they did bring it over, I don't know why they didn't at first, but they got to bringing it over and loading it on wagons and sometimes on the boats.

Q. When they would load it in the boats they would transfer it to the wagons and haul it down the Lead Mine Road
549 to Mack's Creek Furnace, didn't they?

A. I think they did, some.

Q. You intimated awhile ago they would haul it down to the mouth of Mack's Creek, that is supposition on your part, isn't it?

A. No, sir.

Q. Isn't it about as far from Mack's Creek up to the Mack's Creek Furnace as along the road to Mack's Creek?

A. No, sir.

The road was not steep at all. They did not have to ford the creek four or five times. They forded it one time. Wait now; I forget; I don't remember. We used to go down the road and cross the creek and go to church.

Q. You didn't go down the river?

A. No, sir.

Q. You never have been down the river?

A. Yes, sir.

Q. Down Max Creek to the river?

A. Yes, sir; I have been down there, but I can't recall that; I don't remember anything about it, but I have been down there.

Q. And your whole recollection about this ore is very vague, isn't it, and indefinite.

A. I am right forgetful. I can't remember everything.

We lived on the Old Lead Mine Road which I think went by Snowville.

Off and on the people would use the boats sometimes. They used canoes sometimes, but as long as they worked in that ore up there I think they used the boats some. I don't know how long they used that ore from Clark's mill at the Mack's Creek Furnace. I don't remember how long taking the ore across the river and unloading it on wagons lasted.

Q. Now all this boating you referred to stopped long before the railroad was built, didn't it?

A. Yes; as well as I remember, it did.

Q. Several years before the railroad was built up there?

A. I think it stopped before, but I can't remember those things.

550 I can't tell whether in hauling this ore from the Clark's ore bank, the principal part was hauled across the river on wagons. It was not very far from my home. I was not often about it, passing the road sometimes, go up in the fields, and watch them. We owned two farms down there. In going down to Mack's Creek, they would have to cross over Jones' Ford from this side of the river.

Regarding your question, whether there are very rough falls all down between Sand Islands and by Dr. Clark's, and on down in the direction of Jones' Ford by the old Carnahan place, I don't remember about that. I don't know whether there was considerable tide in the river or not. I was too little and young to pay attention to things like that.

Q. All of your testimony is just a vague recollection of years ago, that you cannot be definite about?

A. Yes; I can; I can about that.

Q. You have told about the store; that is definite?

A. I see the stuff boated by.

Q. But you can't remember within ten years of the date, can you?

A. Yes, sir.

Q. What date was it?

A. I know that it has been a good while ago, it has been over ten years ago.

Q. You can't remember within ten years of the date it occurred?

A. No, sir.

Q. You can't remember definitely what was in the boats, or how many boats there were?

A. Yes, sir.

Q. How many boats did you see with lumber?

A. I could not tell you that.

Q. Did you state you saw lumber in the boats, or just logs rafted down?

A. I saw lumber in the boats. I saw shingles.

Q. How many times?
A. I could not tell you that.
Q. When?
A. It was several years ago.
Q. And you can't remember how many boats you saw with pig iron on them?
551 A. No, sir; but I have seen them with pig iron; I think I seen them bringing the pig iron over the river; I wouldn't be sure, or up the river; I know I seen some pig iron there.
Q. But you can't remember what year it was?
A. No, sir; I can't remember that.
Q. Can you remember if the other boating was about the time you saw that pig iron or not?
A. No, sir; I can't tell, my recollection is bad, and I am so old and nervous I can't recollect.
Q. Was this boating after 1900 or not?
A. I don't remember that. It was when I was a small child, they boated there. The boated ore and lumber.
Q. When they would haul this ore from the Clark ore bank you saw it unloaded from the boats and put on wagons, didn't you?
A. Yes, sir; they used to. I could see it from where I was, but I wasn't close enough to see it, but I know they boated some of it down the river, too.
Q. Did you ever see a boat load of ore below Hiawassee?
A. No, sir; I don't remember seeing any at Cox's ferry.
Q. Ever see a boat opposite what is now Delton?
A. I forget.
The witness on Redirect Examination testified as follows:
Q. You did see boats going up and down that river as a little girl?
A. Yes, sir.
By Mr. ABBOT. We object to counsel leading the witness.
By Mr. THOMPSON. When you say a little girl, do you mean ten years of age or five years of age?
By Mr. ABBOT. We further object to the leading of the witness.

By Mr. THOMPSON.

Q. What did you mean by little girl, about how old?
A. I was large enough to take an interest in seeing the boats pass and look at them, they attracted my attention, like most children.

SOLOMON C. FURROW

Plaintiff offered in evidence deposition of Solomon C. Furrow, and the following certificate of a physician, marked for identification Plaintiff's Exhibit No. 19, concerning his incapacity to appear as a witness.

As recorded in the above-mentioned deposition, the witness testified on Direct Examination as follows:

552 I am 49 years old. I live at East End in Radford. I have been here since 1901. I was born right across the river on the Pulaski side. I have been off sick for nearly three years. Before that time I was employed on the Norfolk and Western Railroad. I have been employed by the Norfolk and Western upstream on New River where it is joined by the Little River. I was working on the track, track service.

During that time I saw boats coming down New River. I saw a big keel-bottom boat which I judged to be about 40 feet long and about 12 feet wide. It come right around about 12 o'clock noon. It was coming down with ties. It came down and turned and come under the trestle and up to a flat place and the ties were unloaded. It had about 50 ties on it. Some days the boat would bring ties and maybe the next day it would bring rough lumber. I saw that boat about every other day. I think there were about five or six men on the boat. When the ties or lumber were unloaded they were taken to a flat place and loaded into cars. There is a railroad spur there. Lumber was taken from where they unloaded it about the distance from here to in front of that man's store there across the street, and was loaded on the N. & W. cars. I don't know where it was shipped to.

I saw that right around between 1920 and 1923. I could see up the river about a mile or maybe a mile and a half from where I was working. I know where the Appalachian Electric Power Company dam site is. I could see plainly up to that dam and beyond it.

Q. Could you see boats coming past it?

A. Yes, sir.

Q. Did you see boats passing it?

A. Yes, sir; them boats loaded with ties.

By Mr. ABBOT. We object to the leading form of the questions. He testified he saw one boat come down the river.

Q. You never saw but one boat at a time come down the river?

A. Yes, sir.

Q. When you were working there, name some of the other men working with you?

A. Johnny James, Earl Hardsock, and Sherman Slusher.

553 The witness on Cross Examination testified as follows:

The boat I described they called a keel bottom boat. They only had four or six men. Some days it would come there with four on it, and some days with six on it. Four men could push the boat all right. I don't know who the men were that were on this boat. I don't know the names of any them.

I saw them about every other day. Sometimes we would be up there for a week at a time. Then I would come down and work somewhere else and maybe we would have to go back up there and load ties.

I don't think I worked up there a whole year. I worked there in 1920 and the boats were coming down there then. I mean I saw this boat come down every other day for a week, if I was up there for a week. Sometimes we would be up there about a week at a time and again maybe it would take us about three weeks to get the work done. In all I think I was up there just about a month during the year.

This boat could carry right around 50 ties. It did not have a motor on it, I am sure.

The witness on Redirect Examination testified as follows:

I noticed the boat was poled with four men, two men on a side. I did not see any boats coming down there at any other time than the period which I have mentioned. I seen a raft of logs come down. A fellow had a raft of logs when the peg factory was running.

Q. And you saw them come down the river past where the Appalachian Electric Power Company dam site is?

By Mr. ABBOT. We object to that question as leading and the use of the word "them" he referred to a raft.

Q. Did you ever see more than one raft?

A. Two or three fellows come down with a raft apiece, landing right down here above these falls, below the wagon bridge or highway bridge. We always called it the wagon bridge.

Q. And you saw them as you were standing up at that place where they were loading the ties?

A. Seen them come by there, and then I was working right down here on the main line and seen them come by there.

Q. Where, on New River?

554 A. Yes, sir.

Q. How far down the river would they go?

A. They would land down just above the falls.

Q. That was in the year 1920, now did you see any in the year 1921?

A. Well, I have seen them between twenty and twenty-three.

Q. Would you see them each year of those years between twenty and twenty-three?

A. Yes, sir.

Q. And about a month each year?

By Mr. ABBOT. We object to the continual leading of the witness.

A. Yes, sir.

The witness on Recross Examination testified as follows:

I said I worked up there during the year 1920 about a month out of the year. These ties were racked up there on the ground. I worked there a month out of 1920 and a month each other year. I worked there in the year 1921 and also in the year 1922 about a month out of each year. In the year 1920, I worked there along in July, and in 1921 and 1922 I worked there in the same month, July. In 1923 it was in August I think and not July that I worked there.

A fellow by the name of Mike Fizor who is now dead was my foreman or immediate superior. Mr. Johnny James worked with me. He was my partner putting in ties. E. P. Hartsock and Sherman Slusher also worked with me all during this period. I am sure Mr. Fizor was the name of my immediate superior. James was the last foreman I worked with up there. He was over me after Fizor passed off. Mr. James' superior was Mr. Grubb. Fizor also worked under Grubb. Grubb was foreman and Fizor was assistant foreman.

I mean to say that in each of these months, namely, July 1920, July 1921, July 1922, and August 1923, I saw this boat come down the river with cross ties or lumber and leave the cargo at the mouth of Little River there where I was working. I was not up there in 1924. In 1925 I was in the yard. 1920 was the earliest year I worked up there. The track was laid up there to get that stuff loaded on cars in 1903.

555 The witness on Redirect Examination testified as follows:

I said I was there in 1903. I was not quite far enough up to see boats coming down in 1903.

D. R. Peterson

Plaintiff introduced in evidence a deposition of D. R. Peterson and offered a certificate of a physician marked and identified "Plaintiff's Exhibit No. 20," concerning his inability to appear in person to testify.

Mr. Abbot. For the purposes of the record, we object to all leading questions and the answers and all hearsay. Do I understand those answers are taken under advisement?

The Court. I will note them when I read it over.

Mr. Abbot. We do not have to preserve any exception at this time?

The Court. No, sir.

As recorded in the above-mentioned deposition, the witness testified on Direct Examination as follows:

My name is Radford Peterson—D. R.—I was named after the man the town was named after—old Dr. Radford. I was born in Montgomery County near Riner July 10, 1855, a little village out from Christiansburg. I couldn't tell you exactly how long I have lived here in Radford—about 25 years I suppose. I couldn't tell you when I saw New River for the first time. My father had a place up there before he was married. After he was married he and my mother went on the place out at Riner. I have known of New River and Little River ever since I knew anything.

In 1877 we moved from Riner up on the river to a farm right in between New River and Little River.

Q. Do you recall whether the Government did any work on the channel of New River?

A. Of Little River?

Q. Of New River.

A. Yes, they worked there. I remember that very well.

Q. Do you remember before the Government did that work on New River?

A. Yes. I think they might have brought some boats there—I won't be certain about that, though.

I think some rafting was done. I don't know whether they had boats on there or not. I wouldn't like to make a statement that I don't just know is true.

In the work on the channel they opened these falls—Ingle's Falls—so they thought they could get the boats through. Ingle's Falls is up above here a little ways. I suppose they thought they could make it a navigable stream.

556 I have seen keel bottom boats on the river for quite a while but haven't seen none lately. The old Radford iron furnace up at Mack's Creek used to haul pig iron down the river there when they first commenced there, along about that time. They hauled it from Mack's Creek in boats and unloaded it at New River. I suppose it was loaded on cars at New River, but I don't know.

Q. State whether or not these boats, these keel bottom boats, carried anything other than pig iron?

Mr. ABBOTT. Objected to as leading.

A. Why, yes; they hauled some other stuff—lumber and some cross ties, I think probably.

Q. Do you know whether they hauled any farm products like grain?

Mr. ABBOT. Objected to as being leading.

A. I don't hardly think they carried very much farm products at the time I knew it anyway—mostly I knew of was lumber and ties and pig iron. That is about all I ever knew.

My father did some business with persons working on the river. It was '77 or '78 just before the big freshet in the river and the

Government had these men work a good ways up above the mouth of Little River. I think it was 8 or 10 miles above Little River probably where they were working.

We sold these men bacon out of 90 head of hogs and the Government came there in two keel bottom boats and took the bacon up. I don't know how much bacon was carried but these 90 head of hogs averaged 150 or 200 pounds at least in meat. You know that the meat dries out a great deal after being made into bacon. I think they come there and made two loads out of that in the boats. I think that they took the meat from about 45 hogs on a boat. I won't be sure about that.

Some lumber was hauled on these keel bottom boats. I never saw much rafts of lumber but did see rafts of logs on the river, I think. Most of the logs were unloaded about at New River. It was at New River, on the other side of the stream.

The witness on cross-examination testified as follows:

I think the Government had 2 boats, I am not real sure. Anyhow, they made two loads to get the meat. I don't know whether they had another boat to come and get it or not. It seems
557 to me they brought the men down the river in these boats at the time of the big freshet. We had just sold this meat to them a short time before the freshet and that was all lost to them, I reckon. A lot of the men came very near being drowned but they got on the boats and came down here.

Q. Did more than one boat haul the meat?

A. Just one load at the time. They came there twice and got the meat.

Q. Are you sure, Mr. Peterson, that they didn't carry that in more than two boatloads?

A. About two boatloads, I think it was.

Q. Would you be certain that there weren't three or four boatloads?

A. No. It might have been. Of course that much time makes a whole lot of difference.

Q. I know it does, but I want to get it as accurate as I can.

A. I know we hauled it and delivered it at the river there, and they loaded in on boats—I would say two or three, might have been three boatloads. I wouldn't tell you the boatloads, but they got the meat, and hauled it up there on the boats. That is all I can tell you.

Q. This boating of iron from the Radford Furnace that you mentioned, when did that take place?

A. Well, that was along after I got to the river, they was hauling some down there.

Q. How long did they continue to haul it on the river?

A. I couldn't make that statement. I don't know how long. I know they hauled some, but I don't think any very great quantity.

Q. Was it as much as a year?

A. Well, they might have been bringing some down. They had to wait until they would get a tide to come down through there. They didn't haul regularly, couldn't get through.

Q. How did the Mack's Creek Furnace, or the Radford Furnace, regularly haul its iron away.

A. Why they would be hauling it with wagons most of the time.

558 Q. Where to?

A. I reckon they hauled it to Dublin when they hauled it, to Dublin. They finally quit the boat business and hauled it with wagons again all the time.

Q. Do you know why they quit the boat business?

A. No, I really don't. I reckon they couldn't make a good success of it. I reckon that is the reason.

They hauled iron on the river after we were there about a year. I think that is when they started hauling iron. I wouldn't be real sure about that. They might have brought iron down occasionally for as long as a year. I wouldn't say that they didn't haul iron on the river for more than 2 years. I just don't know.

I have come down several times through the channel the Government built in the river. I reckon when they first taken it out it did some good, but it filled up some again there. There is a ford at Ingle's Ferry. I have forded there many times. I used to ford there all the time when I lived on the farm near there.

The witness on Redirect Examination testified as follows:

I said that I came down through these channels several times. When I worked for George Miles he had a school over here and was a promoter of this railroad and was putting in a dam at Little River for city lights. We had been doing all our hauling on wagons and he decided we would haul in a boat and we decided to have one made, and I had one made by a man named Crafton up at Grayson town. That boat is the one I came through there on hauling lumber. Mr. Miles had a big lot of lumber up there. He had me to have the boat built. We hauled on it a little while but it didn't give very good satisfaction and we quit and went to hauling with teams. Mr. Miles had a big boundary of timber bought from Mr. Harvey about 4 or 5 miles up the river from here.

The witness on Re-redirect Examination testified as follows:

In getting the lumber down which we put on the boats
559 we would sometimes get hung up and it would be quite a while before we could finally get it out. If you had tides you could go on through; if not, you couldn't.

ROBERT HILL MOORE

Plaintiff introduced in evidence the deposition of Robert Hill Moore and offered in evidence as Government Exhibit No. 21, a physician's certificate concerning the witness' incapacity to appear in person to testify.

As recorded in the above-mentioned deposition, the witness testified on Direct Examination as follows:

I guess I lived at Radford or in its vicinity around 12 or 14 years. Before that I lived for about 2 years on a farm of mine in Montgomery County. Before that I lived 13 or 14 years in Pulaski about Linkous Ferry about a half mile. I lived there until I was married when I was 25 years old. After that I went to Pulaski City and lived there about 3 or 3½ years. My mother taken very sick and I went back to our farm and stayed there until she died, probably 8 or 10 years. After my mother died, I stayed on the farm for about 3 years until I sold the farm. I was born in 1867. I will be 69 the first of July. After my mother died I came over here above Linkous Ferry. I lived about 2 or 2½ miles east of Allisonia. I have lived on or near New River nearly all my life.

I first saw boats on New River when I was 10 or 12 years old, I guess. I did not see the boats there for many years after that. I remember when the Government made a channel in the river. I couldn't tell you whether I saw boats there before the Government made the channel or not. The boats I saw were as long as from here to across the street. They were called keel bottom boats and were 40 or 50 feet long, I believe. They bulged out at the top and were 8 or 10 feet wide. They had a keel. They had 2 men on a side and a man in the rear to guide the boat.

I saw these boats near Allisonia. I saw them going both up and down the river. I couldn't say just how many I saw but
there were 4 or 5 or 6. I would say that probably there
560 were about 3 on the water at a time. They carried pig iron and iron ore. They would bring shovels and picks, kerosene oil maybe, sugar and coffee sometimes when they would come back from Central Depot. That is where they said it was from. I don't know where it was from.

I never saw any lumber in the boats. I can't recall that I saw farm produce in them. I don't know whether they got the sugar and coffee at Central Depot except that it came up the river. I can't say whether there were any grocery stores between Radford and Allisonia where they could have gotten these things. I was small, and I don't know.

I suppose it is 25 or 30 miles from Allisonia down the course of the river to Radford but I don't know. Central Depot was at Radford. I came down to Central Depot in a wagon with my father.

The iron ore was carried down the river on the boats. Iron ore is dug out of the bowels of the earth, and put in a washer and washed good. Pig iron is in bars up to 3 feet long.

Q. Do you know whether there was an iron furnace above Allisonia or not?

Q. Do you know whether there was one near or above there?

A. Yes, sir; Boone Furnace was above Allisonia.

Q. Was there any furnace near Allisonia?

A. That is the only one.

Q. How far above Allisonia was it?

A. I guess it is two and a half or three miles.

That is the only one near Allisonia. The boats were loaded with ore just this side of Allisonia at Clark's Ferry, my brother-in-law's ferry. There was a big wharf there. They hauled down there in wagons and unloaded it on the wharf and loaded it on boats. I never saw any pig iron there but I would see some further up the river. When I saw pig iron it would be on boats coming down from Allisonia.

They loaded the ore at Clark's old ferry and taken it down the river one or two miles to what was called Breeding Hill, loaded it back on the wharf there and hauled it to Mack's Creek furnace which was right off of New River ¾ of a mile there between Radford and Allisonia.

561 I have been at Mack's Creek Furnace hundreds of times while I was a boy. After I grew up it went out of business. It was run by charcoal and the timber that produced the charcoal got scarce.

I never saw any pig iron loaded at Mack's Creek Furnace. It was hauled by wagon over to Dublin from that furnace. The pig iron which I saw on the boats which came down the river by Allisonia was from Boone's Furnace.

I saw Mack's Creek Furnace in operation turning out pig iron. They spread what looked like sand inside of the furnace six or ten inches deep and then would take a shovel and make little troughs in it about four inches wide up to the mouth of the fur-

nace, where the metal would run off on each side. They had a steel gauge which they would set down on each side and fill it up. Then after the heating or melting process the pig-iron bars would come out of the furnace.

I saw logs floated down the river when the tide was up. I couldn't say at what time of the year the tide would be best. I paid no particular attention to that. I don't know that I ever saw any rafts, but I saw logs put in the river and saw heavy logs come down.

WILLIAM M. MARTIN

Plaintiff introduced in evidence a physician's certificate, marked Government Exhibit 22, concerning the inability of William M. Martin to appear in person to testify and also introduced in evidence the deposition of William M. Martin.

As recorded in the above-mentioned deposition, the witness testified on Direct Examination as follows:

I have lived in or about East Radford between 45 and 50 years. I am 76 years old. I was born in Newport in Giles County. Radford is in Montgomery County. Giles County is down New River from here. Its county seat is Pearisburg. Giles County is close to Glen Lyn. I lived near Eggleston in Giles County about 10 years. As nearly as I can recall, that was after I had lived at Newport. I lived at Eggleston when I was about 18 or 20, maybe 21 years old. That would be between 1880 and 1885.

562 Q. While you lived at Eggleston do you know whether or not you or your father constructed a boat at that time?

A. Yes, sir.

Mr. ABBOT. We object to the leading questions.

Q. While you lived at Eggleston did you work on a boat there?

A. Yes, sir.

It was a round bottom boat which we called a keel-bottom boat. It was 30 or 35 feet long and about 8 or 10 feet wide and about 2 feet deep. I don't know what it drew. I know one they hauled coal in they had it clear to the top.

We brought this boat up the river and my father sold it to Mr. Richard Gillam. We brought it from a point two miles this side of Eggleston. Eggleston is about 12 miles down the river from Radford. We brought the boat over to New River bridge on New River to a place called New River Depot. This was 11 or 12 miles. The trip was made by my father and three other men who had been working on the river all their lives, Jim Scott, Sam Scott, and Joe Scott, and myself. It took us a day and a half to make the trip up. On the trip we stayed out all night on the river bank. We set up a "sprawl" on the ground. We pushed the boat up with poles.

I don't know that I ever saw a boat called a bateau. I never saw my father's keel-bottom boat after Richard Gillam bought it from him. I don't know where he used it. It took 5 or 6 days to construct this boat.

Q. Along about the time when you were sixteen to eighteen years old, do you recall seeing a steamboat on New River?

A. I was coming up the river one day this side of Hinton, and a boat coming up the river, and I asked someone what kind of boat that was, and they told me a steamboat.

It was 5 or 6 miles above Hinton. It got up there a piece and stalled and I didn't stop to see what became of him, I kept coming on.

Richard Gillam to whom the boat was sold was a prospector for ore. He did most of his prospecting up New River from Radford. I don't know where he went up in there after the ore, I never seen him haul any.

Q. To refresh your memory, he used the boat for prospecting ore?

A. Yes, sir.

Mr. ABBOT. We object to the continuous leading of the witness by counsel for the Government. We object and will continue to urge our objections when they undertake to read the testimony.

Mr. WILLIAMS. Let the record show that no witness in this hearing has been led to suggest any answer that he himself does not know about or any answer he would not otherwise make, but that any mention of names, dates, or places to any witness is made by counsel for the Government to refresh the witness' memory upon matters which the witness has already talked about with many persons.

563 I saw Mr. Gillam the day my father delivered the boat to him. I don't think I heard him discuss what he was going to do with it.

The witness on Cross Examination testified as follows:

I was born at Newport, in Giles County. We lived there until I was about 18 or 20 years old. Newport is about 6 miles from New River. During the time I lived at Newport I did not observe the river any. I never went to the river to fish, or swim, or boat, or do anything like that. When I was 18 or 20 years old I left Newport, and we came down to what we called Spruce Run, which is on New River, two miles this side of Eggleston Springs. I lived at Spruce Run for 10 years, about a mile from the river. I could not see the river from where we lived. I left Spruce Run when I was about 30 years old, and went to Belspring. I lived at Belspring about a year, I think, and then came to Radford.

In bringing the boat which I mentioned up the river there was

3 men poling the boat. My father was along and did only a little of the poling. I was not big enough to do any of it. There were 5 of us on the boat. We carried no cargo of any kind. We didn't get along as fast on the trip as we thought we would. We thought we could make it in a day, and it took us a day and a half.

I remember a point in the river called Big Falls, which is about 3 miles this side of Eggleston. We had a right smart trouble getting the boat over Big Falls. A sluice of water runs down between the rocks. It is pretty steep, and it was awfully hard to push the boat up. I do not remember how long it took to get the boat over Big Falls.

I know the place in the river called Dry Branch. The river is pretty rough there. It is not very deep there. There are ledges of rock running across there that come up above the water. Sometimes you can walk over on those rocks. You can get a boat through that point by picking around between the rocks, but you could not get up there with a load. You have to pick your way through there. I believe the river is counted a mile wide there. I think those shoals run for at least a quarter of a mile or maybe more.

I don't believe I remember any other rough places between Eggleston and here besides those shoals and Big Falls. I 564 don't believe I remember McCoy Falls. I remember a falls at Parrot Mine. Them was the falls I was speaking of. That was below Big Falls, the other falls, and ledge of rock I spoke of.

It took us a day and a half to bring that empty boat from Spruce Run to New River Depot.

The witness on Redirect Examination testified as follow:

There were 3 men by the name of Scott in this boat which I was speaking of besides my father and myself. At this place where I said you could walk across on the rocks it was possible to do so in low water in the fall of the year and mostly in the winter.

Q. Was it high or low water?

A. Low water.

You can cross there in a boat at high water but you can't cross on those rocks by foot in high water.

They hauled coal across there opposite the Parrot Mines in a boat. These mines are down below Belspring about 2 miles. There is another mine across the river at which they haul coal across there near the place where I said you can walk across sometimes in the year.

Along about September and October you could cross there in a boat, and along in the spring and at any time in high water.

They brought the boat up the river to Richard Gillam in the fall of the year. The water was pretty high, not very. You know you can go in between those ledges of rock and pick away where there is a sluice of water large enough to run it through, it will go through all right. I waded the river right above Big Falls one time in the fall of the year. We have both low and high water in the fall.

Q. You could not wade it many months in the year, could you?

A. Not so many, no, sir.

Mr. ABBOT. We object to the leading questions.

The high water period in the river is usually mostly in the spring.

WILLIAM M. DALTON

Plaintiff introduced in evidence a physician's certificate marked Government Exhibit 23, concerning the inability of W. M.
565 Dalton to appear to testify in person and introduced the deposition of W. M. Dalton in evidence.

As recorded in the above mentioned deposition, the witness testified on Direct Examination as follows:

I live in Radford and have been here off and on for 50 years. I was born up here close to Carroll and Wythe County, close to the old copper mines. I don't know exactly how far up the river that is from here. The house I was born in was near New River, about a half a mile from it, I think. I have seen New River from the house off and on all the time. I am 88 years old, turning into 89. I lived at Have Howe's place on a farm a great deal and at Dunkert's Bottom, they all join. I was married on that place. I lived in Radford about 50 years.

I have saw work done on the New River channel by the Federal Government several times, I don't remember when they said they was going to clean it out for boats. I saw them here and up at Ingle's Ferry and along there and also further up the river close to Cherry Branch. Cherry Branch empties into New River up above Have Howe's place. It runs into New River on the right hand side coming down stream. I know a place called Cole's Ferry which is up where the Government workers camped when the freshet came, and they went away and never worked any more. It is located at the islands above the ferry, that is, Towe's Ferry.

Q. State whether or not you have ever seen any keel bottom boats on New River?

By Mr. ABBOT. We object to the question as leading.

A. Yes; I have saw them lots of times.

I have seen them up as far as Cole's Ferry but no farther. The keel bottom boats I saw were about 50 or 60 feet long and had a

round egg shaped bottom. Men stood on each side with poles and shoved them up the river. They come down the river the same way only they had a steering behind where they could turn the boat. These boats carried grain of all kinds nearly and sometimes lumber and they also rafted logs down the river. They carried only lumber and grain, wheat, corn and oats.

I know they carried pig iron in wagons across the river on a ferry boat and hauled it to Dublin in wagons. The ferry was up here across from where the old furnace used to be. The
566 furnace was above Cole's Ferry not far from Linkous Ferry.

The corn, oats and wheat which I saw carried in these boats went to New River Mill across the river from Radford where the railroad bridge is. I know a Mr. Hodge who resided across the river from the old mill. He had his work done over on that flat where those houses are on the other side of the river from Radford. He did not own a boat but he built a little steam boat and had it running here a while, here on New River.

Q. Have you ever seen any logs, rafts of logs floating down the river?

By Mr. ABBOT. We object to that as leading.

A. Yes.

The rafts run there a long time at different times. I couldn't tell you the number but there were lots of them. They went down beyond Dunkert's Bottom down this way. Most of them were unloaded down here at the Hodge place, at the bridge just across the river from Radford.

Q. Have you ever seen any pleasure boats on the river?

A. Never seen none but that little steamboat I was telling you about.

Q. That was a pleasure boat?

A. Yes, they run it from the mill here up here to the ferry up here and backwards is as far as it ever run.

Q. Then they sold it and took it off the river?

A. Yes, I think it went to Hinton, I think that's where they said. I don't know where it went to.

By Mr. ABBOT. We object to the answer as hearsay and move it be stricken.

I remember Linkous' Ferry, Carter's Ferry, Jackson's Ferry, and Lyon's Ferry. Lyon's Ferry is down here. It is not the same as Ingle's Ferry. It is right here in Radford. I remember that the river became muddy many times. This was caused by the washing of ore above here up in Wythe County on New River.

The witness on Cross Examination testified as follows:

I saw several bateaux with grain in them. I couldn't tell you just now how many and then men would have them and run them. I think there were only three different ones.

567 For quite some time they rafted logs down at different times. Just now and then you would see them, you know. Most of them were rafted in warm weather. The rafting was best when there was a little tide.

I can't remember the year that the steamboat was built by Mr. Hodge. It was not more than 10 or 15 feet long. It was used for pleasure boating from here up to the ferry and back down to New River. It was not used for a very long time.

The witness testified on Redirect Examination as follows:

The steamboat would carry several people. I don't know how many.

I saw keel bottom boats going up and down the river now and then. I was not watching the river all the time. I would see them now and then. I was working on the farm.

Q. So you would be back on the farm and just from time to time you would take notice of the river, is that right?

A. Yes, see them going down the river.

Q. And you would see them go up the river too?

A. Yes, see them go back.

The witness on Recross Examination testified as follows:

Quite a portion of the time I was working in the bottoms along the river so that I was close to the river and saw the boats pass. Most everything on the bottom land of the farm would be in sight of the river. Part of the river was in sight of the upland part of the farm but not all of it.

The witness on Redirect Examination testified as follows:

When I was ploughing I was not looking at the river. When I was working along on the river I would see the boats coming and watch them pass.

The witness on Recross Examination testified as follows:

It was a good deal like looking at a train or automobile when it passes.

568 HARVEY C. JOHNSON, by deposition, on Direct Examination testified as follows:

I was born in Adams County, Ohio, and came to the State of West Virginia in 1903. I came to Hinton. I am in the lumber business at Hinton with a firm. The firm is being organized. I don't know what the name or style of the firm is going to be. The name we are using right now is John Raine Lumber Company.

I have been engaged in the lumber business in the vicinity of Hinton since 1902 with the exception of possibly from January, 1, 1933, to October 1, 1935, when I was practically out of the business. Most of the time I have been engaged with companies

in the lumber business. From 1902 to 1914 I was with the Evans and Retting Lumber Company, Grand Rapids, Michigan. From 1915 to 1926 I was with the Arrow Lumber Company, Parkersburg, West Virginia. From 1926 to 1933 I was in business for myself.

I have never been associated with Burks Brothers as a firm. I bought their products ever since they have been in West Virginia. Their office is located at Hinton but they have operations in various sections of the county. Their business is the manufacturing of lumber. They take it from the stump and manufacture it and deliver it to the railroad.

My first business transaction with them was with Z. V. and W. L. Burks about 1911. That was the style of the firm at that time. I bought quite a quantity of stuff. I couldn't recall just the amount. It come from Warford on New River and was delivered to Hinton. Warford is about 12 miles up New River from Hinton. Most of the lumber I bought was railroad stock, switches, ties, and car stock. It was brought down the river partly by bateaux and partly by raft. I was delivered at Hinton at what we call River Landing which is just under the hill at what used to be Avis. It is about the central part of the town now.

569 My duties with Burks Brothers were buying their stock and selling it. When I was in the market for stuff they had, I issued a purchase order at so much per 1,000 feet. That would be delivered on board cars at Hinton, West Virginia, their loading point. The lumber came from what is called the Tom's Run section. Tom's Run is a stream that empties in New River at Warford or near Warford. Burks Brothers had sawmills in that section of Tom's Run. They would have lumber sawed there. They owned their own mills and teams and logging facilities. The lumber which arrived at Hinton was shipped to various destinations. I bought the lumber f. o. b. the cars Hinton. After it was placed on board the cars their responsibility ceased and it became our property.

We shipped this lumber to various points. The large portion of the stock I bought from Z. V. and W. L. Burks went to the Pere Marquette Railroad Company at Saginaw, Michigan. Some went to other parts of the Pere Marquette Railroad Company at Traverse, Michigan, St. Thomas, Ontario, Canada, and Grand Rapids, Michigan. I would say that I shipped in the neighborhood of one-half million feet for this one concern to points outside of the state.

I bought lumber from various other persons also. One was W. L. Neeley, whose address at that time was Pipestem, West

Virginia. Pipestem is not right on the river. It is possibly 6 or 8 miles from the river on top of the mountain between here and Princeton. His lumber came to the river and went down. Both Burks Brothers and Neeley loaded from the same point, Warford.

Another company from which I bought lumber was Butler & Williams. They got their mail at Lick Creek at that time. That is a post office in the vicinity of Warford. Others were W. O. Young, A. T. Farley, and Shumate & Farley, all of whom got their mail at Warford at that time, and J. W. Wyrick, who got his mail at Lorona at that time. There also was J. G. Anderson. I believe his post office was Tophet.

All this lumber was boated and rafted down to Hinton. I would estimate that the total amount of lumber I shipped outside of the state was from two to three million feet, as a low estimate.

I do not have any of the original books of entry. I de-
570 stroyed all my records after they became obsolete. I did not think there would be any further use for them. I done that I would say three years ago. I have testified concerning these shipments from my own knowledge.

Q. Do you know who boated any of this lumber down the river?

A. The larger part of what I bought was handled by Ed Lilly.

Q. That is the Lilly Lumber Company?

A. No; he owned a boat on the river. He boated a large part of it. There was a man by the name of Lane that boated a good bit of lumber, John Lane, I believe; I am almost certain it was John Lane who boated part of it, but Ed Lilly boated the principal part of it.

I paid various prices for this lumber because there were various grades of it. The prices possibly ran from ten dollars a thousand to fifty and seventy-five dollars a thousand, but it would be rather hard to say definitely. I handled all kinds of lumber, principally oak, poplar, chestnut, white pine, hemlock, and basswood. I live at Hinton now.

W. C. ANDERSON, by deposition, on Direct Examination testified as follows:

My post-office address is Hinton. I have it mailed J. B. Route—rural route. I will be 65 in June. I was born in Giles County, Virginia. I moved to True, West Virginia, in 1870.

I moved to True, West Virginia, on a bateau. We moved my father's household furnishings on this bateau and the whole family, all what there was, came along on the boat. We came from what was called Eggleston Springs in Virginia. I think it is called New River now. I ain't certain—I ain't been there since. I could not say how long it took for us to move. We left Eggleston Springs sometime in the night and got to True sometime in

the next evening. That was in the spring of 1879. The boatmen were a couple of colored fellows. I don't remember their names. My older brother and my younger brother were both on the boat and also my mother and father and one sister.

Q. In coming from Eggleston Springs, down to True, did you have any difficulty; that is, did you have to move any of
571 the furnishings or did any of the people have to get off of the boat to lighten it in order to get through places in the river that had shoals or rough water?

A. Not that I recall.

After my father moved to True he followed farming, but he worked the river that following summer. That would be in 1879. His work on the river was in cleaning out a channel for boats. We moved before he worked on the channel. As far as I know there was no artificial channel at that time. I know they cleaned the channel out. I saw men working there.

I saw a steamboat on the river in 1879 or 1880 when I was 8 years old, that June. When I saw this boat for the first time I was at the mouth of the Bluestone at what they call True now. I was in school and the teacher let a bunch of us little fellows go out and see the steamboat. We had not seen one before and it was a right smart curiosity to us. We heard the whistle before we left the school room.

After we moved to West Virginia I saw plenty of bateaux on the river. They hauled freight of different kinds. I saw the bateaux many times. They were carrying things to Hinton. There was a regular dock up here at Hinton where they unloaded at. I rode on a bateau when I came from Virginia and I have been on them many times. I don't remember riding on them when they were loaded with lumber, but I have seen them loading and unloading. I saw them loading a boat at True and saw them unloading boats at the dock at Avis. I could not say how many times I have ridden on those boats, not a big amount of times. I never worked on a boat.

I guess that it has been from 15 to 25 years since I've seen a bateau, I saw bateaux on the river up to from 15 to 25 years ago. I have lived here all the time, not on the river—away from the river, but I would go to and from the river every little bit.

I would not have any idea of the size of the bateau which was used to carry our household furnishings and our family from Eggleston Springs to True, West Virginia. My father was just renting the farm at True, West Virginia. I would say he raised corn, oats, potatoes and vegetables of different kinds. I don't remember that he marketed his products. Wasn't much
572 market here then. He did not raise any tobacco on that place, but they did raise tobacco elsewhere. He never

marketed any tobacco on the river. He hauled it on his wagon to the depot here and shipped it to Lynchburg. The river I was speaking about is New River.

The witness on Cross-Examination testified as follows:

I was born in 1871. I was 8 years old the summer following the time when we made this trip down the river. We come in the spring. I don't remember the month, but it was before the time to put out crops. My father rented a farm after we came here. We generally had a season here to put out corn and oats. We usually plant corn from the 15th of May to the 1st of June. A good time to plant oats here is from the 15th of April to the 1st of May. You generally sow oats over on the river a little earlier. We were on the river then on Bluestone about a mile from True. I don't remember that we planted oats that year. I was just a little fellow, and I don't remember. I know we planted corn and other crops.

Q. Do you recall whether there was a rise in the river when you came down?

A. No; I don't remember.

Q. Do you remember the falls of the Narrows?

A. No.

Q. Do you remember Shumate Falls?

A. No. I don't remember anything we dreaded on coming except Bull Falls. My mother was kinder scary of the boat but when we come to it, it was over in just a minute or two—less than a minute maybe.

The following spring I saw my father working on the channel in the river between True and Bull Falls below Bull Falls. He might have worked above there, but I never saw him that I remember.

We left Giles, that is Eggleston Springs, at night. I don't know how far it is from Eggleston Springs to True. I have never had occasion to investigate that. I have never been back to Eggleston Springs since I left, although I have been in that neighborhood.

573 C. H. WAUHOP, by deposition, on Direct Examination testified as follows:

I live in Bellepoint, which is incorporated in the city of Hinton. I have lived there for about 12 years. I am in the trucking business. I was born in Raleigh County, just across the line from Hinton. I am over 66 years old now.

I have lived on New River, off and on, for the last 30 or 40 years. In all that time I have done business for someone on the river, partly in the lumber business, and partly in the staves business. In the stave business I worked for A. Knabb & Company,

barrel manufacturers, of Pittsburgh, Pennsylvania. I suppose my position with that company was that of manager. I done all the business, bought timber and staves. We worked from 1,500 to 2,000 men. The company had 7 mills in operation that I knew of, and more, I reckon, at other places. We had 5 mills on New River. They were located in Pipestem, Mercer Salt Works, Island Creek, and different places along up the river. We cut the trees ourselves. They were in the stave business, and paid a man to go over and cut the soft wood. We didn't handle nothing but all kinds of oak.

Q. Did you handle any staves?

A. Why, Good Lord, man, we handled them by the millions. It took forty million staves a year to handle our plant.

Q. Where was it?

A. Well, there was one at Crug, Maryland, and one at Marcus Hook, Pennsylvania.

Q. When you cut your staves, what did you do with them?

A. We boated them down the river, and some hauled in a wagon, whichever was the handiest way to get them to the railroad.

Q. Did you take more down by the roads than you did by the river?

A. No, I don't think so, but I never kept no account of that. We took more down by the river. You see we had a wharf rented down here, and we had six bateaux that come down the river.

Q. Six that you owned yourself?

574 A. Yes, sir. Well, A. Knabb & Company owned them, I was just Manager for them, you know. I didn't own no bateau myself.

Q. How big a wharf was that you had?

A. Oh, I couldn't tell you but it would hold a couple carloads of staves.

The staves were sawed for barrels with a round saw. The staves were kept for some time to dry and then they were shipped. We saved freight on them. We let the staves stand to dry for from 90 to 100 days and sometimes for a whole year. If we did not need them we would let them stand for a long time.

There was a bad road to Glen Lyn, and it was a long ways, and so we just stored our staves there. We boated the staves from about 12 miles or maybe just about 10 miles below Glen Lyn. I could not tell you the place we boated from. We only made 5,000 up there and the road was so bad that we had to take them in wagons, if we taken them at all, and so we did not buy any more timber in that section. Those that we got we put on boats and boated them down the river.

I would estimate that the staves which we boated ran from 18,000 to 20,000 staves to the carload. That is as much as you could get

in a carload. I don't remember the number of carloads that we shipped per year, but I kept at it regularly until the war broke out, and then I sent all those papers to Mr. Knabb at Marcus Hook. I couldn't tell you how many cars we shipped. We bought a lot of staves besides ours too. We bought them all over the country outside of this district.

Mr. Burks' boys made a lot of staves for us and I taken these staves up in the yard and they were shipped out. These boys got their money—the rest of their money—from Marcus Hook, but we advanced them one-half price when the staves were put on the yard. The yard was wherever they were cut, that is, the place we rented and stacked staves. We might put a mill in and stack the staves there.

Now, up here at Crump's Bottom we had land rented there, and Mr. Dickinson and several of the stave men hauled staves there. We bought the timber from Levi P. Morton up here at Red Sulphur Springs and we cut that boundary and hauled down to the mouth of Indian Creek.

Knabb and Company was the biggest operator along the
575 river in the shipping, cutting and manufacturing of staves. It took from 1,500 to 2,000 men to handle that business. Knabb and Company did not cut any other kind of timber. When we paid the men the other people got the lumber business and we put the lumber in and sold it locally.

Q. Do you mean by that, that other than the staves, you sold it locally?

A. Yes, sir. Now, like the Lilly Lumber Company, they had a wharf up here, and we hauled and boated lumber down here to him, and stacked it up here in Avis at Mr. Joe Hinton's place.

Q. Did you see this other lumber brought down the river that you sold to them?

A. Oh, Lord, yes; time and again.

Q. How was it gotten down the river?

A. Well, it come down in the boat, but we hauled it down to the river in a wagon.

Q. Hauled it to the river upstream, and then you put it on boats?

A. Yes, sir; but we had to take it just the same as staves.

Q. And then it was brought down to your wharf; is that true?

A. Yes, sir.

Q. And it was sold to others here?

A. Yes, sir; the lumber part of it was, but not the staves.

Q. The staves, you handled and shipped all the way through yourselves?

A. Yes, sir; to Knabb & Company.

Q. What other operators were there on the river at that time cutting staves, if you know?

A. Oh, there was several fellows there cutting staves; I don't know who all.

Q. Did you ever know a man by the name of Miller, or Miller Brothers?

A. No; I don't know of any by that name that made staves. They made lumber.

Q. And you don't know whether the Miller Brothers made staves or not?

576 A. No, sir; I don't know.

Q. Mr. Wauhop, why did you cease cutting lumber in this country? But before that, when did you cease cutting lumber in this country?

A. Thirty years ago—cutting staves. We were not in the lumber business—just staves.

Q. Then I should say when did you cease cutting staves?

A. Well, we quit here and then we went on—we quit in this country—that was about when we quit here was about the year 1930.

Q. Oh, 1930. I thought you said ten years ago.

A. It has been thirty years.

Q. Now, let's get this clear. I understood you to say that the stave business, so far as you were concerned, ceased thirty years ago?

A. Yes, sir; that is when we quit here. Because we bought all the timber out, and we went and bought other places.

Q. Do you know whether there was any other stave business going on after you quit here?

A. Very few, because all of these people sold their staves to A. Knabb & Company, and then the Standard Oil Company bought some and sent them to Jersey City.

The witness, on Cross-Examination, testified as follows:

I don't think I ever heard of a company called the Standard Stave Company which operated in the stave business. The Standard Oil Company is all I ever heard it called. I knew the man who was a local representative for that company, but I can't think of his name. He was kind of an old man, as old as I am. I remember now that his name was Arter. It was about 30 years ago that I operated in the stave business on this river.

Q. Well, you just stopped about thirty years ago. When did you start?

A. Well, it has been about nineteen, I guess, somewhere along there—1920, some place like that. We worked for four years and you can figure it back. When the war broke out we had to quit.

I don't know where the Sulphur Springs branch is at. It is on Mr. E. E. French's place that we cut the yard of staves.

577 The staves were boated down the river. The road was so bad to Glen Lyn that we loaded our staves on the bateau and brought them down here cheaper than we could take them the other way. Glen Lyn was much closer. The reason we cut no more up there was the roads were too bad; it was too far to haul them and too far to boat them.

These six bateaux we operated were owned by the A. Knabb & Company. We had regular crews and some of them rented the boats and they hauled them. We had only five boats, we had six and then sold one to a fellow during the year. During the time that we were engaged in this operation, the boat landing was rough here. I could not say how many boat landings there were here at Hinton or Avis, as it is called. They have ferries across the river, or did, and there were different places to land.

Q. Well, were there not certain specified unloading places over here at Avis, where the bateaux unloaded, as you have described?

A. But that is right across there from the lumber people; that is not there; you know the Lilly Lumber Company was there and they sold out to these other people, and they were right there at that place where these people is.

Q. Is that what they call the old steamboat landing, Mr. Wauhop?

A. That's the very place.

I could not tell you whether any of the boats using the river at that time unloaded at any other place than the steamboat landing. There was no other docks, wharves, or structures put up along the river down there only what we put up by Knabb & Company. Lilly Lumber Company docked at this particular loading place—the one Mr. Knabb had—because they used our lumber part of the time when we had any to ship.

There were from 18,000 to 20,000 staves in a carload. A. Knabb and Company mills took 40,000,000 staves in a year and used them at the barrel factory, you see. That is where they was used. They used this many staves to make barrels, but we did not make half of them. They came from all over the country, here and elsewhere.

Q. At the time you were buying staves, here, were other operations going on?

578 A. Yes, sir; I should say so. Why, Tom Beckwith at Princton, and Farley, and all of them—they all sold to A. Knabb & Company.

Q. How many men were employed by the A. Knabb Company in this stave operation?

A. Well, we generally used from sixteen hundred to two thousand men. You see there was all these seven mills to operate, you see.

Q. The men that you employed, were they men living here in Hinton?

A. No, sir; from out here in the country, and just anywhere we could pick them up.

Q. You employed choppers, splitters, planers and everything else in that business, did you?

A. Yes, sir; that's just what we done. We hired a lot of men in them days.

The witness on Redirect Examination testified as follows:

I turned in my books to the company at the time of the war. I was manufacturing staves up to that time down in Kentucky then. I ceased here 30 years ago. Stopped work here and sent out stuff to the places.

It was cheaper to send the staves downstream because the roads were so bad we could not get them up to Glen Lyn. There was only a horse path up there and we couldn't do it. I couldn't tell you how heavy the loads were which the men put on the boats up there. I didn't stay with the boats.

We didn't carry any staves to Glen Lyn by boat. We boated them downstream. The roads were too bad up there to take them up that way and they were too bad all the way down the river to Buck Smith at Bull Falls.

Q. And they were so bad that you couldn't haul staves successfully?

A. That is right.

By Mr. JACKSON. I object to these leading questions.

We had six bateaux and we let another fellow have one, leaving five. In addition to the five that we owned we rented bateaux for hauling staves. The fellows who already had bateaux furnished their own and boated the staves down the river themselves.

The capacity of the A. Knabb & Company plant back east was 40,000,000 staves. We also made staves at our mills
579 in Kentucky. We had seven mills here in this vicinity, but they were not here on the river for the whole time, just for about five years. We only had the seven mills here for about three years. We cut the stuff and shipped it down by boat and maybe there were five mills on the river.

The capacity of one of these mills per day was 8,000 staves, if we had good luck. I could not tell you how many staves a year we loaded during the three-year period when we ran the five mills. It depended on the weather, and you couldn't tell about

breakdown. They might get over the bank, and the machinery might break down and all, and that would be very hard to say. I have no recollecton as to the actual running days. When there was no breakdown or anything we worked right on with the mill.

(It is stipulated that the witness, C. H. Wauhop, desires to change his testimony as to the location of the sawmill described by him, as being at the farm of E. E. French, to show that the mill he had in mind was below that farm and up on Island Creek.)

ANDREW G. FLANAGAN, by deposition, on Direct Examination testified as follows:

I am 83 years old. I was born in Fayette County, which is 40 miles west of here on the Chesapeake & Ohio. I lived in and around my birthplace for 22 years, then I went to Hinton, and have lived in that vicinity ever since, a little over 60 years. Next April 21 I will have been here 62 years. My birthplace in Fayette County is considered a mile and quarter from New River by county road, but it is only ¾ of a mile from the river in a line directly across the mountain. I was born a little less than ¾ of a mile from New River, directly across the mountain. Hinton was the nearest town to my birthplace.

Since I moved to Hinton, I have clerked in a store, worked for the Chesapeake & Ohio, around seven years as clerk and agent, been Deputy Sheriff for a while, and also Mayor of the town, and Chief of Police of the town for a while, and done various other things. I commenced clerking in the depot here at Hinton
580 on April 21, 1875, and worked there until sometime in 1883. I was clerk a while, and then I was agent a while. There were always two people in the depot, a clerk and an agent. When I was clerk, a man by the name of Gunther was agent. When I was agent, I had two or three clerks. One of them was W. V. Calloway, and another was W. H. Pemberton. I guess I was clerk about four years, and agent about three or three and a half years.

As clerk my duties was to check the yard office and the yard master. I worked at both that and also handled freight and was clerk. After the first year I received and shipped the freight; that is, I checked the freight to be shipped out on the Chesapeake and Ohio Railroad, which was the only railroad here.

Q. In that capacity were you able to see with your own eyes what freight came in, and what was shown by the bills of lading and what came in and where it came from and where it went?

A. Yes, sir; every bit of it.

Q. Was there any movement of commerce, goods, or merchandise there of any sort on boats on New River from 1875 to 1883?

A. Yes, sir; there was wheat and tobacco and some produce that came down the river.

Q. Wheat, tobacco, and some produce?

A. Yes; that came down the river and some goods were shipped back up by bateaux.

Q. How were the goods brought down the river?

A. In bateaux.

Q. Do you recall whether or not the traffic was general at that time, whether or not more than one bateau was moving up and down the river at that time?

A. I don't know how many there were.

Q. Would you say more than one?

A. I think there were, but I couldn't say how many.

Q. Can you recall the names of shippers who brought their goods in on bateaux?

A. I don't know that I could just now.

581 No hay or corn was shipped, but wheat and tobacco were. These products came from the country up New River. I had no knowledge of the shipping points up New River. I don't know where the products came from. I just know it came down the river. I have seen bateaux coming down the river when I was working at the depot and I saw them both before and after that. They said they brought it down the river. I didn't go up there to see if they did. There was nothing on the shipment to show that it came down the river. The only marks on the shipments showed where they were from and where they were going. The bateaux were unloaded up here just under the bluff, over here where that switch going down at the lower end of Avis is. That was the old wharf for the bateaux that came down the river. I have been there during those years.

Q. Did you ever see bateaux unloading there?

A. I have never seen one loading there. I was busy working.

Q. Did you ever see them loading there?

A. I have seen them—I don't know whether they were loading or unloading.

All this tobacco and wheat that was brought down and shipped passed through our freight office and was reloaded on the Chesapeake and Ohio. It was mostly tobacco and wheat, between 1875 and 1883. They brought the goods in and checked them and I gave the parties receipts for them. I did not do the billing out. I would put it on the market books so the billing clerks could make bills out for it. I just made a note on the book of the article shipped, so many pounds of tobacco and so many bags of wheat, who they were from and who they were going to. The shipments were not regular, they were not daily or anything like that. I

have run as much as a carload of wheat and a carload of tobacco in one day, but that was not regular.

Q. Do you know whether any of this tobacco or wheat was being hauled from up on New River down to your station at that time?

A. Might have been some, but not very much.

Q. You have no recollection of it?

582 A. Might have been some from short distances.

Q. As far as you know all of that came down on boats?

A. Most of it. Might have been some locally hauled from not so far.

It was all transferred from bateaux to wagons and brought to the depot. The wagons would go to the wharf and get the goods. I paid no attention to who the fellows were who drove the wagons. There were various ones—any teamster that might come along.

I think the greater part of the tobacco went to Richmond and the produce went to Baltimore, I think. It is my recollection that they went there. I am almost sure that the tobacco went to Richmond. I think the wheat went to Richmond or went to Baltimore or Philadelphia. I am not positive that any went to points other than Richmond. It is too long back for me to remember.

Q. During all this time from 1875 to 1883, or about 1883, that you testify you were Clerk or Agent, were there bateaux on the river carrying goods during all of that period, boats going up and down the river with produce on them?

A. They carried this tobacco and stuff and wheat that I was telling you about and some goods went back up.

Q. During all that period were boats on the river? That is what I mean.

A. Yes; they couldn't go nowhere else. There was bateaux.

Q. You knew they couldn't go anywhere else?

A. Sure.

Q. I just didn't make myself clear. I will try and make myself clear to you. What were the products shipped back up the river?

A. Merchandise and stuff they bought here was hauled to merchants up the river.

Q. Did any come through the depot, to the station, and was then sent to the wharf and then sent up there?

A. Yes.

Q. What kind, what type of commodity would that be?

583 A. Such as any country merchant would have. Dry goods, clothing, and such stuff as that.

Q. What were some of the points up the river where the country merchants bought goods?

A. I paid no attention. They came here and had an order to get the goods and I delivered them to them.

I would turn the goods over to them here and the wagons would take them away. They would give me a receipt and pay the bills. All this merchandise was shipped in here from points outside of Hinton. The goods were shipped from Richmond or Lynchburg or other points, were shipped in on the Chesapeake & Ohio.

Q. I am sorry. From what points would these goods come?

A. I don't know where they bought them from—some from Richmond. I made no record of them.

Q. Can you recall now?

A. No; I can't. I don't want to. I don't know anything about it. I can't remember who these people bought from or where.

Q. I have mentioned Lynchburg and Richmond. Did some of the shipments come from those towns?

A. I rather expect some came from Richmond. I couldn't say positive.

I knew some of the persons who ran these bateaux. There was one named Alf Merchant who did more than anybody else at that time. I think possibly some of the Medleys worked with them. Mostly colored fellows worked on the boats. No white people that I know of. I never rode on any of these bateaux. They was perhaps 30 feet long maybe and something like 8 feet wide with rounded sides and round bottoms. After I ceased as agent at this depot I was Deputy Sheriff here and I had various other occupations.

The boats continued to run up and down the river very little after 1883. I think they ran until the Norfolk and Western was completed and that after that they practically quit. I mean until the Norfolk and Western was completed to Radford or somewhere up in there. The traffic up there almost stopped, although
584 there might have been some. I was not connected with the depot and did not know much about it. I didn't pay much attention to it. There might have been some traffic by boat, I am not sure.

The Government cleaned out the channel up New River about 1877 or 1878, I think. I think some boats were run on the river prior to the construction of this channel. I could not say whether or not more boats were used on the river after the channel was constructed, but I imagine there were. I did not see the men working on the river cutting these channels. I seen the channel after they worked on it.

I remember a steamboat being operated on the river along in the early 80's. Its name was the "Cecelia." A man named Miller paid $100 to get it named the "Cecelia" after his wife. The steamboat made a trip or two up the river and back. I don't think it carried anything but passengers. I don't know under what power it was driven. I saw it but I don't think I was ever on board. It

was not propelled by oars or poles, but was run by steam as far as that is concerned.

The witness testified on cross-examination as follows:

Q. You don't mean to leave the impression that everything that was shipped from Hinton while you were clerk or station agent came down New River?

A. Oh Lord; no.

Q. Nor that everything that was received here was received for people up New River?

A. No, sir.

Q. How far was the boat landing at Avis where these bateaux used to load and unload from the Chesapeake & Ohio station the freight station, when you were agent?

A. The direct distance is not more than five or six hundred yards, I reckon, but the way they had to come from there it was fully a half mile.

Q. How far was it by river?

A. That would be by the river from the depot up.

Q. Five or six hundred yards?

585 A. Yes.

Q. How close was the freight depot to the river?

A. Right on the railroad track down here right on the river. It was above the track. The track is between the depot and the river.

The witness on redirect examination testified as follows:

There was just a little eddy where the boats stopped there at the wharf at Avis where they unloaded these bateaux. There was no platform or no apron. The boats could not have gone on around to the freight yard because if they did they would get into the shoals and they could not get up and down in the shoals which are in the river between Avis wharf and the depot.

586 T. G. SKAGGS by deposition, testified on Direct Examination as follows:

Q. Give the stenographer your name?

A. T. G. Skaggs.

Q. Will you please state your name for the record?

A. Give which?

Q. Give your name, please—your name?

A. My name?

Q. Yes, sir.

A. Skaggs, T. G. Skaggs, is my name, I thought you all knew that.

Q. How old are you, Mr. Skaggs? Watch my lips and read them.

A. If I live until the 23rd day of this coming August, I will be eighty-seven years old.

Q. Where do you live now?
A. I live right up here on James Street with my children.
Q. In Hinton?
A. Yes, sir.
Q. How long have you lived in Summers County?
A. I was born in Summers County, and I have spent my life in it, but it was Monroe County when I was born, but I have spent every day of my life in Summers County.
Q. When did you live, if at all, on the New River?
A. Sir?
Q. When did you live on the New River?
A. I was raised on about half of New River.
Q. Where?
A. Just beyond the mouth of Indian Creek, up there. I have been right on New River all of my life, in about a mile and a half or two or three miles right up New River.
Q. Are you a farmer?
A. I have spent my life farming.
Q. And where did you farm?
A. At Indian Creek.
Q. At Indian Creek?
587 A. Yes, sir; partly, but I lived over here on Wolf Creek for twenty-five years, and then I moved back and spent my days there.
Q. Where?
A. At the mouth of Indian Creek on New River—right where I was raised in about a mile and a half of New River.
Q. Did you ever live with your brother on New River?
A. My brother?
Q. Yes, sir; or any other person of your family?
A. I lived up here on Captain Fowler's farm up here on New River.
Q. Where is that located?
A. Right at the mouth of Indian Creek; that brick house—big red brick house was the old Fowler home.
Q. Did you ever see any bateaux on the river before the Government did any work on the channel?
A. Oh, Lord; yes.
Mr. JACKSON. We object to that question.
Mr. THOMPSON. Yes; I withdraw the question.
Q. Did you ever see any bateaux on the river?
A. Why, yes.
Q. When did you first see bateaux on the river?
A. Well, I just can't tell you the first time I ever saw one on New River, or how long it has been, but they were on there for many years.

Q. Did you ever see them on the river when you were a boy?

A. No; there was no bateaux—well, I was in my teens; you might call me a boy.

Q. When did you first see bateaux on the river?

A. Well, I just can't give you the date.

Q. Can you not give us the date, approximately?

A. Well, they was on New River from the time I was seventeen years old until I was up in thirty or forty. While I lived right there on the river there were plenty of bateaux on the river.

Q. Did you ever see the Government doing any work on the river, clearing the channel?

A. Yes, sir.

Q. Were there any bateaux on the river before the Government did that work?

A. Oh, yes.

588 Q. Were there few or many?

A. Well, I don't know just how many, but one time my father brought a lot of corn across the river from where we lived from the old man Crump over there, an old Irishman lived there by the name of Quinn, and he brought the bateau and put the corn on it.

Q. How old were you then?

A. I was sixteen or seventeen years old, and that has been a long time ago for I will be eighty-seven years old in August.

On our farm up on New River we raised tobacco, wheat, corn, all kinds of farm products, sheep, horses, cattle, and such as that.

There were no steamboats on New River before the one Captain Fowler put on there. We was just talking about it last night. The name has slipped my mind, you know, but I will tell you about the boat. I believe the name of it was the Cecelia. I first saw that boat one day when I was at the dock and they were making the boat. They built it up here on the bank of the river below the ferry in Avis. I don't know who the man was who built the boat, but he came here and built it. I never got acquainted with them. When they were building it I asked them how long it was and they said it was 125 feet long.

I could see this steamboat running on the river when I lived on Captain Fowler's farm. I could see 4 or 5 miles along New River. The Fowler farm was right at the mouth of Indian Creek. He was a man that owned a great deal of land. They built that boat in the fall of 1874, if I am not mistaken. I told you in the other room what made me remember it. In the fall of the year in December 1873, my second child was born which was before the February I moved to that farm. They built it along in that fall.

I don't remember how long that boat ran on New River, but it did for a number of years. I saw it running during all of the four years I lived on that farm. I never paid any attention to how often that boat made trips up the river. They would go up and down the river and get a load and come back. I have seen this boat loaded with staves, lumber and the like of that.

Q. Did you ever see any tobacco on that boat?

A. Well, they hauled tobacco, but I don't just know that I saw it on there, but I saw them haul it to the place where they put it on, and they told me they hauled it there to be loaded on the boat.

Mr. JACKSON. Motion to strike the answer.

589 Q. You never saw any tobacco on the boat, did you?

A. I wouldn't be positive about that, but I am satisfied there was because they hauled it to the place where the boat stopped and unloaded it there in an old Blacksmith shop.

Q. Where was this blacksmith shop that you speak of?

A. It is on the bank of the river up there about a mile below the mouth of Indian Creek, and that is where the boat stopped.

Q. Whose farm was it you said you were on at Indian Creek?

A. Elbert Fowler farm.

Q. Did he raise tobacco?

A. Oh, yes. Yes, sir. You see he lived on a large farm there at one time, and they were slave owners and he owned a lot of land.

Q. What did he do with his tobacco, if you know?

A. Well—

A. (Continuing.) Well, I don't know what he done with it, but they shipped it to Danville, Lynchburg, and other places.

Q. Do you know that of your own knowledge?

A. No, sir.

Q. How did he get it from his farm, what did he do with it?

A. It was shipped away.

Q. Did he move it away from his farm?

A. Well, his tenants would ship the tobacco, themselves, or he would do it for them, and his farm lay right along the river.

Q. How would they ship it, if you know?

A. Well, they would ship it by steamboat, bateau, or haul it to Hinton on the wagons—one of the three.

Q. Did they do all three?

A. Not very much. They didn't run wagons very much to Hinton when they could get the bateau or steamboat.

Q. Did you ever ride on the boat?

A. No, sir; and I am at an age that I never want to be on it. I didn't want, to, I was afraid they would get me in there and hang up somewhere and I couldn't get out. No; I never rode

on it, but I have been—one time I was on the dock when they made it.

590 Q. And you say it ran for four years?

By Mr. JACKSON. Objected to as leading.

A. Yes, sir. I heard it after that, but I couldn't see it when I moved away from the river on the mountain, but I could hear it.

Q. How far up New River have you been?

A. Well, I never was any farther up than Pearisburg in Giles County.

Q. Where is Pearisburg, in Giles County—what State is it in?

A. Virginia.

Q. State whether or not you have ever seen in your time any bateaux on the river in Giles County, Virginia?

A. No, now, I have seen them in Giles County, but I can't give you no dates on that, and I don't know just how far up it was, and can give you no positive statement, but I have seen them in Giles County, and was told last night they went into Glen Lyn.

By Mr. JACKSON. We move to strike that out.

The witness on Cross-Examination testified as follows:

I don't know that anyone came to see me last night. Dr. Skaggs was talking with me where I live. He is my son and lives up here on James Street, close to the funeral home in Hinton. Nobody never come and asked me to testify. My son told me that they come after me to come down here to testify. I believe it was night before last that he told me this. That was the first I heard about coming here to testify. I don't remember talking with anyone else about it. Dr. Skaggs did not tell me why they wanted me to testify. He told me that it was something in regard to the steamboat on the river, but did not talk very much about it.

Q. Well, he did talk to you about the river and the steamboat last night, did he not?

A. Well, he told me that was what you all wanted with me.

Q. And he talked with you about it, didn't he?

A. We had some conversation—some words spoken about it, but I don't remember what.

Q. Didn't he tell you that they wanted to know if you remembered about a steamboat?

A. He asked me that question. Yes, sir.

Q. And he asked you if you didn't remember different

591 things about the river. Isn't that right?

A. Yes, sir.

Q. And he suggested several things to you about the river?

A. Well, he just asked me about the steamboat, if I ever saw it or knew anything about it, and if I was ever on it.

Q. Had you ever talked to Dr. Skaggs about it before that?

A. Oh, not that I remember.

Q. You don't remember talking to Dr. Skaggs about the steamboat until last night, do you?

A. No; it was night before last.

Q. And you talked to Dr. Skaggs about it night before last, and last night, too, I suppose?

A. It was mentioned a time or two, but I don't know that we had any particular conversation about it. He give me to understand that you all wanted me to come down here.

Q. And tell about a steamboat?

A. Yes, sir; and asked me if I remembered anything about it.

Q. And didn't he tell you that they wanted you to come down here and tell about the bateaux on the river?

A. Yes, sir. He asked me about the bateaux and other kind of boats; that was the conversation, but we didn't talk very much about it. I told him I had seen all of those things and knew all about them.

I think I am quite clear that this steamboat was called the Cecelia, but I never could remember the name of the thing. I did not want to get on that boat. I did not know what might happen. You never can tell what is going to happen on a steamboat. I have heard of them getting smashed on the Ohio River and I am afraid of the things and I am not much of a man to get on the river anyway. I never did ride on the Cecelia. In fact, I never did have time. I was a farmer and was always too busy, and I was off from there working and I didn't want to ride on it anyway. I came to Hinton frequently when I was farming. I also came on horseback or in a buggy. I had my own horses and buggies. We didn't bring no produce here to Hinton in those days. We generally sold eggs up there at the farm. Sometimes I would come here and buy things if I could'nt get them up there.

592 Q. Now you are very clear that the Cecelia started to operate in 1874?

A. It was that year, I think. You see it was built down here at Hinton.

Q. Built here in Hinton?

A. Yes, sir; it was built by the man I lived with, Elbert Fowler, who was the foreman, and they built it right close to the Avis Ferry. I was right there on the dock and saw it when they were building it.

Q. Now, Mr. Skaggs, how long was it after the Government cut a channel before you saw the Cecelia on the New River?

A. I don't know. That channel was built before the boat was built, maybe, but I am not sure about that. I believe it was.

Q. That channel was cut then, before the boat was built?

A. That is my opinion.

Q. Is it not true, Mr. Skaggs, that one reason they decided to build the boat was because the Government was cutting a channel, do you remember that?

A. No; I don't remember that.

Q. You don't remember?

A. No, sir. I think that channel was already cut before the boat was built, is my recollection.

Q. And you think——

A. I don't remember, but I think there was a channel cut there for the purpose of running boats in it.

Q. Surely, and that is the channel the steamboat, the Cecelia, run in?

A. It had to run in the channel.

Q. I suppose so.

A. Well, it couldn't run just anywhere in the river, it had to run in the channel. At certain places it had to run in the channel, in the riffles, but outside of that it could run anywhere in the river.

Q. How far above Hinton, how many miles did you live up the river?

A. It was twenty miles from Hinton to the farm I lived
593 on, and it was sixteen miles to the mouth of Indian Creek, to the Fowler farm, where he lived.

Q. Could you see the Cecelia from where you lived if it came up the river?

A. There was four years of the time that I could. I lived on Captain Fowler's farm for four years, and that boat run up and down the river all that time—I was on the mountain and I could look down the river. Yes, sir; I saw it, and then my business was down there on the river at the Fowler farm and I have seen it all the way along, from Hinton all the way up there. Yes, sir; I saw it.

I noticed it more the first year because it was something new then. I could not tell you how often I would see it coming up to Fowler's farm the first year, but it came very frequently. I don't know whether it made a trip every day or not, but I don't think it did. I think it would come up one day and go back the next. They would come up and load lumber and when they got their load they would strike out again for Hinton. I could not say that it came every other day, but it came very often. How many times or how many trips I couldn't answer.

I was born in Monroe County about a mile and a half from the river at the nearest point. From the farm where I was born the nearest point to New River would be the mouth of Indian Creek, and it emptied you see into the New River. Yes, sir; that is where I was born. After leaving the farm I was born on and married, I lived for four years up there on Captain Fowler's farm, four

miles below the river. Indian Creek come down there into the river right down there at his farm. After that I bought a little farm about six or eight miles north from where I had lived. That was only three miles from the river. It was down at Pack's Ferry, which is about four miles above Hinton. When I bought my farm, I bought a farm out this way, and I lived right close to Pack's Ferry, about three miles back on the mountain. I moved out there in the latter part of the winter of '78, to the best of my knowledge. I was past my 22nd year when I was married and moved to the Fowler farm at that time and stayed there for
594 four years. I lived in that neighborhood in all for 25 years and then eventually moved back to the farm where I was born and lived there until I had passed my 78th year and then I moved here to town and stayed with my children.

I. C. STOVER, by deposition, testified on Direct Examination as follows:

I reside at Hinton, West Virginia. I am 37 years old. I have lived in Hinton for thirty years. I am Assistant Cashier of the First National Bank of Hinton.

As a boy I worked near New River. I lived on the south side of the river from 1907 to 1921. That is the opposite side of the river from where we are now. From 1912 to 1918 I lived in Avis, which is now a part of the city of Hinton. When I lived in Avis it was about 100 yards from the house to the river. We were near two lumber docks and two cross tie shoots for loading cross ties.

When lumber was brought down the river it was not very difficult to deliver it on the dock. My work in connection with the handling of lumber was to help unload lumber and staves from bateaux on the docks. I would also help load cross ties, which would burst loose from the rafts. They were in rafts and I helped load them to the shoots and I helped load staves in railroad cars.

I would see bateaux coming up and down the river and would see it land. They contained lumber and barrel staves. I don't recall any merchandise being on them. I never helped with any merchandise.

From 1912 to 1917 I worked principally for the Lilly Lumber Company. There might have been some other firm there also, but I cannot say at this time. I worked on the docks there for the Lilly Lumber Company and on the tie shoot. They used the docks there, but I don't know who owned them. I got the lumber up and unloaded on the docks and subsequently loaded it into railroad cars where it was shipped. I worked directly for the Lilly Lumber Company. As I said, my work consisted of unloading

595 staves and lumber from the bateaux on the docks and loading staves and lumber from the docks to the railroad cars and helping unload cross ties from the rafts on the railroad cars.

Regarding the different kinds of lumber I saw coming through to the Lilly Company lumber docks, there was some heavy timber as I recall, principally just board timber, but some of it was heavier than board timber. There were also barrel staves. The cross ties came down in rafts. There was a distinction made between what they called export lumber and other lumber, but I did not understand it at that time. I was between 13 and 18 years old.

I would estimate the number of carloads per year between 1912 and 1917 that the Lilly Lumber Company loaded on the cars here at 150 carloads. It would average not more than three or four cars a week during the summer months. Possibly that heavy in the winter. But somewhere from 100 to 150 cars per year would be my guess. I loaded this lumber on the Chesapeake & Ohio which had a spur track to the wharf or docks. The road was a broad gauge standard road for standard size cars.

I actually helped to transport the staves from the boats to the cars. The ordinary procedure was to unload the staves and lumber from the boats and stack it on the docks and possibly in a day or two, maybe three or four days or a week, we would load it into the cars. I don't recall for certain, but it was very seldom that we loaded direct from the bateaux into the railroad cars. The same staves that came in by water would be loaded right there at the railroad into the railroad cars. During the period from 1912 to 1917 in which I worked there I received wages.

Q. State when was the last time you saw, or know of, a bateaux being on the river, or going up and down New River, I mean.

Mr. JACKSON. Just a moment, I object to the form of that question.

A. Well, I would say between the period from 1920 to 1925—along during that period, but of course I am not certain. I do know that they worked on the river there a few years after I quit there.

I don't recall having seen any merchandise unloaded there. The boats might have taken some, but I don't know that I saw any.

596 The witness on Cross-Examination testified as follows:

I did this work with the ties and lumber from 1912 to 1917. I did not work continually during that period. I would go to school for nine months and work during the three summer months. A good many times on Saturdays I would go down there and if there was any lumber coming in I would work.

Q. So from necessity, some of your estimates had respect to a period when you were in school, that you wouldn't know very much about, but you are taking that into consideration; I mean, your total estimate?

A. Well, as far as my working there was concerned, I don't know when I was not working there, except that our house was in a hundred yards of the dock, and I knew what was going on there just the same as if I was working. I wouldn't be there during school hours, of course.

Q. Generally speaking, but if you were in school, you, of course, would not know of your own knowledge.

A. No, sir; not when I was in school.

Q. And you say your school years was nine months.

A. Eight or nine months. Yes, sir.

Q. Eight or nine months term?

A. Yes, sir.

I don't recall any bateaux coming up the river from below Hinton. They came down the river to the docks there and returned. They came down loaded and went back empty.

I said the staves and lumber were loaded into standard size cars. The box cars ranged in length from 32 to 34 feet up to 40 feet. 40 was the maximum at that time, and their cubic capacity varied along with that.

There were two docks at this landing. There was one which I supposed belonged to the Lilly Lumber Company where I handled the stuff and there was another dock below that about 50 or 75 yards. Some other lumber company had a tie shoot and small dock which was in charge of Mr. Ebe Gwinn of this town. He was in control of the other lumber dock. In all there were two docks. The larger one must have been from 100 to 150 feet in length along the side of the bank of the river and some were between 30 and 60 feet in width, but I am
597 just guessing at these dimensions. The dock extended out level and was perpendicular with the edge of the water. The perpendicular part of it extended down into the river something like three or four feet. I could not say whether or not it was built on piles. The other dock was not as large. The spur of the Chesapeake & Ohio Railroad that ran down there had a single track.

It would take less than a day to load a car of lumber and staves. The time would vary, depending on how many were working. Sometimes the crew would be larger than other times and they would load 3, 4, or 5 cars of cross ties a day. They averaged a day or a little less in loading staves and lumber. Sometimes they would be working both a crew on the cross ties and a crew on the lumber dock.

The witness on Redirect Examination testified as follows:

When we were loading staves from 3 to 7 or 8 men would be a crew for a car. Ordinarily the loading was done from the docks into the cars and from the bateaux on to the docks and then into the cars. To load ties it took a minimum of about five men or sometimes six or seven to load cross ties.

The estimate I made of 100 to 150 a year was an approximation from my recollection. I lived near there. We would discuss the number of cars with others and I would see the cars in there. I would see them going out. The spur down there is that of the Hinton Builders' Supply Company. That is the same spur that used to be down there.

The cross ties came down in rafts and they had an electric shoot run by electricity with hooks on it and they would bust the ties loose from the rafts and the hooks would catch them at the bank and slide them into the car.

The method of getting the lumber out from the bateau was to hand them out of the bateau to other men and there was a platform there about half way between the water and the top of the dock. There was a gangway there. The staves were always handled in bunches of five. They were stacked that way. The men on the gangplank would hand them to the men on top and put them in stacks.

598 ROBERT CALLOWAY, by deposition, testified on Direct Examination as follows:

I am 62 or 63 years old. I was born in 1873 in Hinton, West Virginia, and left there in 1909. I am the son of Matthew Calloway. I reside here. I am an accountant with the Merchants' Transfer and Storage Company.

When I was at Hinton I saw steamboats, gas boats, bateaux, and skiffs—small boats—on the river. Bateaux are boats 55 or 65 feet long, possibly 70 feet, with a 9-foot beam. A keel-bottom boat is more or less flat on the bottom.

I saw three or four bateaux running on the river at the landing at Hobbs. I was there playing around the river you might say. I worked in the bank at Hinton and I was with the railway company about three years, more or less, as assistant agent doing clerical work. My father has been assistant agent there too. I was with the railroad a long while after he was.

These bateaux carried merchandise of different kinds. They used to pick up freight and take it upstream as far as East River. They hauled tobacco. Downstream, I think, they hauled grain, but I don't remember definitely.

Q. Did you ever see them carry any lumber?

A. I don't recall.

I saw the work of building channels for navigation going on in the channel of the stream in the river. I think the Government was doing this. The first channel was was just outside of town about a mile upstream from Hinton.

I have seen steamboats on the river. The first one was the "Cecelia." I saw that when I was an infant, five or six years old.

I helped build a boat only about twenty feet long which had a steam boiler. It ran on the river and I rode on it.

I do not remember a captain Davis and I do not know of a boat run by him called the Davis boat. Starbuck ran one there about fifty feet long, probably in 1905 or 1906. I remember it running on the river.

The supplies which I saw coming down the river in the bateaux were taken off the boat and delivered to the Chesapeake & Ohio freight station at Hinton by truck.

599 Q. Do you know whether they were put on board the trains or cars?

A. No.

Referring to plaintiff's Exhibits 6, 7, and 8, which you have handed me, I see one Mr. Hobbs right in front of the picture marked Exhibit 7. He is the man with the whiskers in the bateau. That is a bateau all right.

In the picture marked Exhibit 6, I see Mr. Hobbs and Mr. Jake Hoover. He is sixth from the right side of the picture. I see every indication of a bateau in that picture.

In the picture marked Exhibit 8, I see Mr. Hoover about in the middle of the boat. That is a bateau of the type which has been referred to in my testimony. That is the kind I saw on New River. Referring to plaintiff's Exhibit 9, which you have handed me, the boat in the picture looks like Mr. Starbuck's boat. I do not recognize the man who is looking out of the window.

The witness on Cross Examination testified as follows:

I stated that I have seen steamboats and gas boats as well as three or four bateaux and that I had seen the "Cecelia." I also testified that I had built a twenty foot steamboat myself or helped build one and that Mr. Starbuck had a steamboat. There were two gas boats which I saw. I saw the steamboat "Cecelia" at Hinton moored at a landing there.

I stated that I ran my twenty foot steamboat on the river. I did not run it between any special points and had no special landings. We went up the river four or five miles. We played with that steamboat about two years running it on the river.

I could not tell you exactly how long I saw the "Cecelia" on the river. I think parts of it are there yet. I think a portion of the hull is lying down there. I built the twenty foot steamboat for pleasure purposes.

MATTHEW V. CALLOWAY by deposition, on Direct Examination testified as follows:

I am in my 91st year. I was born in Princeton, Mercer County, in what was then Virginia, but now is West Virginia. Princeton is 25 miles from New River. I lived in the country. I was 600 24 when I left the farm for business. That was about 67 years ago. I had a business for a time at Flat Top Mountain, which is quite a distance from New River. I worked for the Chesapeake & Ohio Railroad for a short time as Assistant Clerk.

Q. When you had that position, did you have anything to do with freight brought down the river?

By Mr. FORBES. We object to the form of question, as leading.

A. Yes, sir; I had something to do with it.

Q. What did you have to do with it?

A. My duties were to check out the stuff to the boats that run up the river.

Q. Did you ever see any bateaux on New River?

A. Certainly, numbers of them.

Q. When was the first time you ever saw them?

A. Along in the early seventies.

Q. What time would you put the early seventies?

A. 73 or 4.

Q. And what were the bateaux doing?

A. They weren't operating very much on the river at that time, but later they operated quite a good deal.

Q. And in the early time, when you first saw them, what were they doing?

A. Handling freight on the river, to and from, up and down the river.

I have been on a bateau, but not very many times. We took excursions on them on the river. The farthest I went up New River on a bateau was about eight or ten miles on an excursion. I rode on loaded bateaux part of the way. They carried merchandise up the river to various points. I could not describe exactly what they carried. I think the freight which they carried up the river came from different points. It would come in on the railroad.

Q. Did you ever see any lumber coming down the river?

A. Yes, sir.

By Mr. FORBES. We object to this line of questioning as very, very leading.

By Mr. THOMPSON. I am willing to state I am, to some extent, leading this witness but the witness is very deaf and very old and I feel I am justified in so doing.

Q. State whether or not you ever saw any bateaux coming down the river with lumber on them?

A. Yes; coming down the river with lumber.

601 Q. Where would they be going?

A. To Hinton.

I don't know what use they put the lumber to. I saw lots of staves come down the river. They were loaded on cars and shipped away from the town. I don't know the destination of the freight.

By Mr. FORBES. At this juncture it should be understood that our previous objection stands to all of these questions. In view of your statement, I haven't repeated it.

Q. Do you recall when the Norfolk & Western Railroad was being constructed?

A. Yes; I remember the time.

Q. Where was it being constructed?

A. Between the mouth of the East River, thirty-three miles above our town, and a place they call Glen Lyn. That's the name of the station, I think.

Q. Do you know whether any materials for that railroad were brought in on the C. & O. Railroad?

A. Yes, sir; several carloads, I recall.

Q. What did you do with those?

A. Checked them out to the order of the Norfolk & Western, to a man in charge of the bateau, who carried it up the river to the works.

Q. You know the materials came in on the railroad and was put on the bateaux?

A. Yes.

Q. And the bateaux went up the river?

A. Yes, sir.

Q. But you don't know how far?

A. Supposed to go up to the works, thirty-three miles above our town.

By Mr. FORBES. We move to strike from the answer what he supposes.

A. Purported to go up to the works.

Q. Is that the nearest point the Norfolk and Western would be to the river, at Hinton?

A. Yes, sir; nearest point.

I recall when they were building the Capitol at Charleston.

602 We had some shipments come down there from a mill 20 miles from our town. They were transported by water to Hinton and shipped to Charleston for repairs on the Capitol building. I can't remember exactly what time that was. The point 20 miles up was Shanklin's Ferry.

I recall timber being shipped in there which was taken to the sawmills. The William James Sons Company run a mill there at that time. After the timber was sawed up quite a quantity

of it was disposed of in town for building purposes. I don't remember whether any was shipped while I was working for the railroad.

Q. State whether or not there was any tobacco shipped down the river?

A. Yes; quantities of it.

Q. Before the building of the Norfolk and Western, it came down by boat?

A. Yes.

Q. What happened to it after it got there?

A. Transferred to the depot and shipped, some consigned to Richmond and probably some to Lynchburg.

Q. Consigned to Richmond?

A. Yes; ostensibly.

Q. Before the building of the Norfolk & Western Railroad all the freight that came into town for shipment came down the river on boats?

A. Yes.

The witness on Cross-Examination testified as follows:

Q. Mr. Callaway, did you ever see any of the products from the country above Hinton brought into your station by wagon?

A. Not very much, sir. I don't recall any quantity. Occasionally they did bring in some by wagon, and a quantity of merchandise was shipped from our station to the country on wagon. We shipped loads of stuff out to Princeton.

Q. Which railroad was constructed first?

A. C. & O. was constructed first.

Q. Before the Norfolk & Western?

A. Yes, sir.

Q. Did you ever see any building materials or material of any kind being unloaded from the C. & O. at Hinton and taken up all the way to Glen Lyn by boat?

A. I checked it out of the cars myself.

603 Q. I asked you if you had ever seen any of the materials leave Hinton and go up the river to Glen Lyn by boat?

A. No; I only delivered it to the representative of the company, the man in charge of the business.

Q. So far as your own knowledge is concerned, from what you actually have seen you don't know whether it was loaded on the boat and later transferred to wagon or not?

A. The stuff that was shipped, the material used in construction of the Norfolk & Western Railroad was delivered to a man who came there with his auto for the purpose of loading the boat and shipping it up to Glen Lyn.

Q. Whether that material was transferred to wagon before it got to Glen Lyn, you of your own knowledge would not know, would you?

A. No; I don't know that.

I have gone up the river some 8 or 10 miles occasionally on excursions or picnic trips.

I started working for the Chesapeake & Ohio Railroad about 1881 or 1882. I left the service of the company in 1884. I was stationed at Hinton most of the time. At least I was attached to that office from 1881 to 1884. I can't give you the exact dates. That is the best of my recollection. My duties during that time were very much in the same capacity, in a general business, you know, handling everything that came along. Mr. Flannigan was agent at the time and I was his assistant or clerk or something. Call it whatever you please. I tended to various duties, whatever would come up.

The witness on Redirect Examination testified as follows:

Princeton was 20 or 25 miles from the river at the nearest point. When I took material or freight from Princeton it went by wagon down to Hinton and the merchandise that was shipped from Hinton to Princeton went up on wagons. It would have had to have been hauled 20 miles or so to the river either way to have shipped it up and down the river.

I have spoken of a part of the Norfolk & Western, not the part that went through Radford, but the part that went up near East Lynn or East River. When the materials came on the Chesapeake & Ohio to Hinton the representative of the railroad put them on the boat and they went up the river.

604 The witness on Recross Examination testified as follows:

Regarding whether or not all of the materials remained on the boat after having gone up the river, the intention was that they should. I don't know of my own knowledge how far up the river they went. I did not go with them.

Depositions of A. E. Miller, R. W. Martin, J. C. Martin, E. F. Tomkies, and Dorsey Barton were submitted by plaintiff as part of the record without formally reading them.

Physician's certificate on W. C. Ratcliffe, a witness from Radford, Va., and physician's certificate on Edward Roop, a witness from Radford, Va., and physician's certificate on J. H. Likens, a witness from Radford, Va., were offered in evidence by plaintiff as Government Exhibits 24, 25, and 26, respectively.

Plaintiff offered in evidence in connection with the deposition of Roxie M. Brown Government Exs. 27, 28, and 29, Exs. 27 and 28 being daybooks and Ex. 29 being a ledger of the Lilly Lumber Company.

Mr. ABBOT. It is understood, of course, the objections we made at the time the depositions were being taken are applicable?

Mr. WILLIAMS. Certainly.

A. E. MILLER by deposition testified on Direct Examination as follows:

I am in my 76th year. I have resided in Hinton since 1889. That would be 46 or 47 years. Before I came to Hinton I resided on Lick Creek and on Green Sulphur, near Green Sulphur Springs. Lick Creek is a tributary of New River about 10 miles below here. We have two Lick Creeks—one 20 miles east of here and one 10 miles below. The latter is the one at which I was born.

I am now in the wholesale grocery business and have been for 33 years. Also my brother and I operated a lumber mill on New River. It was located at one time on Pipestem Creek and then on top of the mountain above the creek, two or probably three miles this side of Pipestem Post Office. Then from there the next set we made was on the Lick Creek that runs into New River about 20 miles east.

Our lumber came out by bateaux between 1895 and 1900. Our mill was a portable one and we moved it around from
605 place to place. It was a combination sawmill and stave mill. It cost less to move the mill to the timber than the timber to the mill. When we had exhausted the timber in a neighborhood we would move it over to a new stand of timber.

Q. Were these various places you speak of on New River where you moved the mill?

A. None were directly on the river, but they were on tributaries and our lumber had to come to the river to be transported to market.

Q. Did you transport all the lumber by water to Hinton?

A. As far as I know we did.

Q. Why didn't you transport it by road?

A. It was too expensive. It would cost as much to bring the staves from Lick Creek to Hinton as we were getting for the staves almost. It was a losing proposition. We could bring them by bateaux twenty miles down the river for one-fifth of the cost of hauling by wagon—maybe less.

I cut other timber than that which I made into staves. I cut oak, poplar, ash, and quite a bit of pine. The first and second grades of poplar we sold to lumber buyers who shipped out of the state. There were both first- and second-grade lumber and also culls and cheap lumber. We found a home market for the culls and cheaper lumber in and around this state.

I would say the capacity of this stave mill we had was five or six thousand staves a day, but I don't suppose we ever operated to capacity. We sold the staves altogether outside of the state. We sold all of them to the Standard Oil Company which had a monopoly on the stave business in this country. I have manufactured staves for them for years. I have been connected with the lumber business for 25 years until the last 25 or 30 years. We shipped staves to the Standard Oil Company to Bayonne, N. J., and we may have shipped some to Cleveland, Ohio. We had a contract with the Standard Oil Company for so much per thousand for inspected staves loaded on cars f. o. b. Hinton. There is not any question but that they were all shipped outside of the state to the various refineries.

The process of making staves is as follows: The tree is cut down and sawed off in stave-length blocks and then split up
606 and brought to the mill where they go to the stave saw and then are run out in the yard and stacked up to be seasoned for 60 days. Sometimes we had them stacked much longer than that before the Standard Oil Company inspector came to the mill to cull the staves. They made us an advance on them after the culls were reported so that we would not be put to a lot of expense. We never cut staves in advance of a contract for shipment. I received pay for the staves from the Standard Oil Company which made an advance payment on them after they were inspected by their inspector and reported. Then when final delivery was made and the staves shipped they paid us the balance. The payments came principally from Cleveland, Ohio.

It has been many years since these staves were manufactured and marketed. My brother kept the records and he is dead. I don't know exactly where the staves went to, but I know they were shipped out of the state. I do not recall the size of any of the orders we got from Standard Oil Company for staves. We always had orders for a sufficient quantity to cover the set that we were making. The timber that we had purchased was estimated to make so many staves and we always had a contract before hand. I cannot give you the number of staves that were called for in any contract which we had with the Standard Oil Company.

This is all Standard Oil business, but in the meantime we cut four or five thousand staves that didn't come by New River. They came directly to Hinton. That was between 1895 and 1900. But the staves we cut on the Pipestem was in the year 1895.

Then we cut another set in another territory and then in September 1897 we moved the mill to Lick Creek, where we brought the staves to the river about 20 miles east of Hinton and we cut there I know positively 403,000 at that set. They were wagoned to the

river and loaded from yards thereon to bateaux and brought to Hinton. We probably had to carry them on wagons 4½ miles down grade from where we cut them to the river. When we got them to Hinton we brought them to the dock up here. Wasn't much of a dock and there was a siding there. We stacked them up there and loaded them on instructions from the Standard Oil Company. M. D. Tomkies and sons had the contract and
607 they loaded the staves and no doubt gave the billing of them to the railroad company. They loaded them on cars of the Chesapeake & Ohio Railroad Company.

I went in the lumber business before I was 25 years old and was connected with the lumber business up until about 30 years ago. That would make at least 25 years that I was connected with the lumber business.

Q. During that period of time did you know that there were other persons or firms or corporations that were cutting timber on New River above Hinton and were boating it down to Hinton, and putting it on the Chesapeake & Ohio Railroad and shipping it?

A. Yes, sir; I do.

Q. What other corporations, do you recall, or companies?

A. I remember D. M. Meador—he was operating at the same time we were and I know there were other mills.

Q. Was the Lilly Company operating in your time?

A. The Lilly Lumber Company?

Q. Yes.

A. I hardly think they were operating at the same time I was.

Q. Do you remember their operating?

A. Oh, yes. They done quite a business all over this country—up this river and the surrounding counties.

Q. Do you remember any other company or firm?

A. There possibly were other firms, but I can't just recall who they were.

Q. During that period of time would you care to give an estimate of the amount of lumber that was boated down New River, put on the Chesapeake & Ohio and shipped out to other parts?

Mr. JACKSON. Will you specify the period of time?

Mr. THOMPSON. The period during which he said he was in the lumber business. That was for twenty-five years.

A. I could not, the exact amount. I could make an estimate.

Q. Will you make an estimate?

A. Yes. I know that 100,000 feet was brought down and shipped and possibly a great deal more.

608 Q. You mean not more than 100,000 feet?

A. I wouldn't say it was more than that.

Q. You mean in the whole thirty years?

Mr. JACKSON. He said twenty-five years.

Q. In the whole twenty-five years?

A. I thought you had reference to what we loaded and sent in here by bateaux and that was shipped out of the state. We brought it down here and sold to lumber buyers, who would ship it out. I can't say to where.

Q. I don't know that I get your answer clearly. You mean you and your brother shipped out 100,000 feet, or that you sold it to other people who shipped it out?

A. We sold it to other people who shipped it. We manufactured poplar and ash and walnut and export oak, and we cut a great deal of pine and second-grade oak—there was more of a local market for that, although we sold I. N. Johnson and Ward Hahn in Ohio—I can't give the name of the Ohio town now after thirty-five or forty years—we sold them some as well as poplar.

Q. How did it leave the state?

A. Went by the C. & O.

Q. You put in on the Chesapeake & Ohio Railroad?

A. Yes. That went to Ohio.

Q. I am asking you now to make an estimate, if you can, of the amount of lumber that was cut, in feet, and brought down the New River during your time and put on board the railroad and shipped out of the country? I am now including all kinds of lumber.

Mr. JACKSON. By "your time" do you mean the time this gentleman was in the lumber business?

Mr. THOMPSON. Yes; I fixed that twenty-five-year period.

Mr. JACKSON. Sometimes we speak of your time as your lifetime.

A. Is that what you want to know all of it that has come down since the C. & O.—Oh, millions and millions of feet; I don't know. I couldn't give you anything like an accurate esti-
609 mate, but millions and millions and millions—hundreds of millions, I expect. There is a tremendous area up there that was well timbered that come out that way.

We paid so much per thousand staves to the bateau men to transport them from the yard to Hinton. We had a little yard there at Haynes Ferry on the bank of the river where we loaded our staves and lumber or where the wagons unloaded and they were reloaded on the bateaux. It was the same way at Mercer Salt Works and at Lick Creek. It was impossible to bring the staves down the river any other way than by bateaux.

The witness on Cross-Examination testified as follows:

Our mills were portable sawmills—stave and sawmills combined. Most of the sawmills in this territory were portable, except that of William James and Sons here at Hinton. They had a big mill here and they had a big stationary mill at Ronceverte.

Q. What rate per thousand did you pay the bateau men for bringing the staves down?

Mr. THOMPSON. I object to that question on the ground that it is too uncertain. If you will describe the distance——

Mr. JACKSON. I think Mr. Miller knows the distance better than I do.

A. The staves transported from Mercer Salt Works, we paid $2.25 a thousand, and the ones that were bateau'd from Haynes Ferry, I don't know whether it was $1.25 or $1.50 a thousand.

Q. That included loading and unloading them?

A. Yes, sir; that included loading and unloading.

I don't remember the rates from any other places. That is the only two points we bateau'd any from. It makes quite a difference in the weight of a stave whether it is dry or green. I think 5 pounds—it's been so long. I would say 5 pounds for a thoroughly seasoned stave. They were 36 inches long and ⅝ of an inch thick, and I believe the width varied from 4½ to 6 or 7 inches. That is just an approximate weight.

610 I think that is near it.

The witness on Redirect Examination testified as follows:

I was testifying to the weight of the average stave. I couldn't give you any idea as to how many staves there are in a barrel of average size. I may have known about that but there is so much difference in the width of the staves. I said the weight of one of the seasoned staves was approximately 5 pounds, but that may be a little too heavy. It has been so long since I weighed a stave that I don't remember the average weight of staves.

R. W. MARTIN by deposition on Direct Examination testified as follows:

I was born in Mercer County, W. Va., and live over here on Madams Creek, which is a tributary of New River and flows into New River opposite Hinton. I was raised at the mouth of Bluestone River and moved here when I was about a year old. I am 67 years old. I work mostly at logging and farming. I have been a farmer all my life.

Q. Did you ever do any work on the river?

A. Yes, sir.

Q. What kind of work?

A. I have rafted cross ties, skidded logs, and worked on the river right along.

Q. Did you ever work on a bateau?

A. Yes sir.

Q. When?

A. Well, for the last fifty years off and on, but I ain't worked none now for about ten years.

When I was a boy there was lots of lumbering going on up the Bluestone River. Staves, lumber, and everything would be hauled down the river to the mouth of Bluestone and loaded on bateaux and brought down here. I worked for many and
611 many a day for a firm by the name of William James & Sons that cut ties up there. They cut lumber on the Bluestone River and run the logs down New River to a place—Pack's, and then they caught them there and rafted them the rest of the way down. Pack's place is three or four miles up here. They brought them across the river and floated them down on the right hand side, that is, the Bellepoint side. They had a good mill up here in Avis, they manufactured and sold some lumber here in town, and they shipped some too.

Q. Those boats came down Bluestone, did they, carrying everything——

A. Carrying everything anybody wanted them to. Yes sir.

Q. Now, you say everybody, who do you mean by everybody?

A. Everybody who wanted to ship wheat, corn—whole loads of corn, and whole loads of wheat, tobacco, and all such as that, when I was a young man.

I remember tobacco growing up there in that country 28 or 30 years ago. They are not growing tobacco any more here in West Virginia. They must not have been getting a big lot out of it, I reckon, growing it and shipping it, they used to haul it all the way from the Salt Works. I never hauled tobacco down from the Salt Works myself, but I have seen it loaded and hauled. That was about 45 years ago.

The James people did not use any motor boats in connection with their bateaux. They floated their logs up here to James'. They had to raft them to Bellepoint, and they had a wire across the river there. They had a boom up there at Jim Pack's, but that has been 45 or 50 years ago since they went to work there. I did not come down here to town, I just stayed in the woods back by Lerona. I have come down here, but I stayed mostly in the woods when we were doing that work.

They didn't run any bateaux down Bluestone River. I ran bateaux just on the main river. They used to run the bateaux up as far as Mr. Barker's place, which is up about the mouth. They run the bateaux about a mile up there to what they called the old race and loaded a lot of staves there.

I have not worked any on the river for 10 or 12 years; 10 or 12 years ago I was carrying staves mostly for Zack Lilly and another man. They had a stave mill. Zack Lilly
612 was an individual. Caesar Lilly also had a lot of staves.

I brought the staves down to Hinton and delivered them here at this landing. When I went up the river I carried a cargo if anybody wanted us to take anything. I did not carry anything down the river but staves.

The witness on Cross Examination testified as follows:

I was not asked to come here and testify. I just come in here. My cousin, J. C. Martin, come in here and I just come along with him and another man. J. C. Martin is the man who just testified before me. I just happened to be in Hinton today. No one in particular asked me to testify in this hearing today.

The witness on Redirect Examination testified as follows:

I came in with Mr. Coulter. Mr. Coulter talked with me about it before I came up.

The witness on Recross-Examination testified as follows:

I do not mean that Mr. Coulter talked with me at my home. I was here in town and talked with him on the street. I told him my cousin was here and I was coming up to see him and he asked me to testify. I told him about working on the river.

The witness on Re-redirect Examination testified as follows:

Mr. Coulter asked me what I could testify to. He asked me what I ever did on the river. You asked me what I did on the river. You went over with me all of the questions that you asked me before I came in here.

The witness on Re-recross Examination testified as follows:

He did not go over the answers with me, he did not know anything about what I was going to answer.

J. C. MARTIN, by deposition, on Direct Examination, testified as follows:

I am 62 years old. I live in Raleigh County, W. Va., at
613 the present time. I was born in Mercer County, W. Va.

I have lived on New River at the point known as Crump's Bottom from the spring of 1888 until 1904. When I went there the Government had made a boat shoot or a channel for boats. The Government has not done any work that I know of after I got there. My father was living at Crump's Bottom. He was a farmer and I worked on the farm part of the time.

The rest of the time I boated on the river. My father raised corn, wheat, and things like that. He did not raise any tobacco. I do not know when the tobacco business ceased in this country. They don't raise any tobacco here now. They raised a little in

1904, but not very much. My father consumed most of the crops he raised on his farm.

I saw bateaux on the river and handled one for three years prior to 1904, but off and on for 7 years. I boated lumber for a number of people, including D. M. Meador, Morgan Meador it was, and Boone Burks, that is B. B. Burks, and boated staves for both of them. I boated this lumber from Round Bottom, but Mercer Salt Works was as far up as I boated staves.

While I was working on these bateaux I carried lumber and staves and some corn and tobacco. I carried the cargo to Hinton. Sometimes we would take a load back and sometimes we wouldn't. When we used man power to propel the boat we didn't take very big loads. We took some merchandise sometimes. I never used a motorboat alongside a bateau. I don't recall any store at Round Bottom during my time. There were stores down the river at Mercer Salt Works, at Indian Creek, and Bull's Falls. I carried some merchandise for Cox at Bull's Falls and some—a little bit for a merchant named Mose Webb, a merchant at Indian Creek, and some for a Mr. Shumate, a merchant at Mercer Salt Works.

The last time I have seen the river as an inhabitant of this district was in 1904.

ELBERT E. TOMKIES, by deposition, on Direct Examination testified as follows:

I reside at Hinton, W. Va. I was born there and have lived there practically all of my life, with a few years' exception. I am a merchant and a banker. I am Executive Vice President of the National Bank of Summers in Hinton. I will
614 be 50 years old in October.

I have hauled or carted staves or lumber from the landing down here where the boats land to the railroad for a period of 4 or 5 years, maybe a little longer, between the years 1895 and 1900. My father had a contract for loading staves for the Miller Brothers during all of that period and for D. M. Meador—Morgan Meador—and frequently for some smaller mills along the river.

The bateaux would bring the staves down New River. I saw the bateaux coming down the river and have rode on them when they were loaded with staves and I would land down here at Hinton on the river bank where the Hinton Builders Supply Company is now located, right above the mouth of that little branch. At one time this branch that comes across the railroad, under the railroad, but just above the railroad crossing, went about where the state highway is now and then turned and followed parallel to the river down to the Hinton Builders Supply

Company. The mouth of it is there, but of late years it goes straight into the river. Some of it has been filled in.

The bateaux would bring the staves down to the wharf at the point I have described. Then they would unload right on the river bank. Anywhere from 60 to 70, probably 75 feet, from the side track of the Chesapeake & Ohio. They would unload that right on the river bank. We had the contract to move them up and place them on the cars for shipment.

The amount of staves one of those cars would hold depended on the size of the cars, which varied. Sometimes we would get 25 or 30,000 in a furniture car. A small car would hold 22 or 28,000. The average car had a capacity of from 28 to 30,000, I should say.

After the staves were put on board they were sold to the Standard Oil Company. Most of them went to Newport News, Va., but some would go to New Jersey. At that time the Standard Oil Company had a local agent here and he stayed for a number of years. His name was Mr. Theodore Arter. He was the local purchasing agent. I never had a contract with him, but I know that was his business. He resided in Cleveland, Ohio, but he is dead now.

Q. How many staves do you estimate that you loaded on those cars during that period, or how many carloads did you ship a year?

A. Seventy-five to a hundred cars a year.

The cars held approximately an average of 28 to 30,000. I loaded not less than 14,000,000 staves from the boats onto
615 the train during the 4 or 5 years I worked there, and that is giving it 14,000. (Figuring with a pencil.)

Some staves were loaded and shipped down the river by others. We loaded for two other people for a while—D. M. Meador, he gave his entire time to the lumber business, and the Miller Brothers were just part of the time, it was just a side line with them. Mr. Meador shipped a great many more staves than the Miller Brothers and was in the business a great many years longer.

Q. Were staves being shipped down the river, if you know, and boated down the river, and put on the train and shipped out before you went to work there?

A. Yes, sir. Years before.

Q. And after you went to work?

A. Yes, sir.

Q. And after you ceased to work there?

A. Yes, sir.

Q. State whether or not you observed the lumber business on this river with respect to that that was boated down the river and put on the railroad and shipped out of this country?

A. Yes, sir; for we discontinued the handling of staves. I was in active charge of the general merchandise business, and for a period of about fifteen years we handled a good many railroad ties—cross ties and many of them were rafted down the river, and I was in and out the yards a great deal, checking, etc., and during all of that time there was a great deal of lumber being transported, also staves.

By lumber I mean sawed lumber ready for the planing mills. It is very hard to estimate in feet the amount of lumber which I observed coming down the river by boats and being put on railroad trains and shipped out of this country. The store which I ran was a retail store.

Q. Did you ever sell any goods from your store to the people up the river?

A. Oh, yes, sir; we had quite a number of customers from up the river.

Q. Would you be selling to stores or to individuals?

A. Individuals, mostly.

616 Q. What was the character of stuff that you sold to customers up the river?

A. General line of merchandise, clothing, groceries, feed, and hardware.

Q. How was that carried to your customers up the river, if you know?

A. Well, of course, a good many of them would come in in wagons, but nearly every boat, the bateau, when it would come down the river would have passengers going and coming, and they would frequently bring in their produce on the boats, and then take what they would exchange their produce for, take it back on the boat; you see the people lived along the river and the boat carried passengers—some.

Q. And what did you see in the way of produce that came down the river?

A. Well, while——

Mr. JACKSON. Now do you know that landed here?

A. (Continued.) Yes, sir; I know it was landed here for I have seen it many a time. While working up there, I remember on one occasion there was an entire bateau of corn, not shelled, delivered down there, and the mill, which was nearby, hauled it up to the mill and stored it there, and frequently, they had corn and various kinds of products, almost anything that was produced along the river. Sometimes they would bring in livestock. I have seen them bring hogs on the boats and occasionally a yearling or a steer.

Q. Anything that was raised on a farm?

A. Yes, sir; chickens and eggs because the roads were so rough, and there was no breakage on the boat like there was with a wagon.

We do not still have the store which we had then. The road was changed and the store we had is now on a dead street. We discontinued the store when they put in the overhead crossing, but we have a store over on Third Avenue, which is still in operation.

Q. How long since you have seen a bateau on the river?

A. I would say that it has been ten or twelve years, some-
617 thing like that.

Q. And were bateaux at that time, carrying commerce, cargo, or everything?

A. It carried cargo, just what do you mean by commerce?

Q. Well, cargoes of farm products.

A. Yes, sir; farm products, and sometimes wholesale houses would deliver their merchandise to the stores. There was not a great many stores along the river, but it would deliver them to the wharf, and all of it would be carried into the bateaux.

Q. And shipped down the river?

A. Yes, sir.

The witness on Cross-Examination testified as follows:

Q. The computation that you made about the quantity of staves, am I right in understanding that was just a multiplication of two hundred and eighty thousand by four?

A. That is just an average of the number of staves in a car. Sometimes there were thirty-five thousand and sometimes twenty-two or twenty-five thousand.

Q. The only computation you made was to say twenty-eight thousand—or two million eight hundred thousand rather, and multiply by four, and you show the result to be fourteen million, is that right?

A. Yes, sir; but I was giving the benefit, to make my estimate low enough—I gave it four years instead of five, but we really loaded it for five years.

Q. And to keep it low enough, is that the same reason you took fourteen million, instead of eleven million two hundred thousand?

A. That is about the average. That paper doesn't show the correct multiplication, but that is about the average as I explained to you.

Q. I mean, you took fourteen million, instead of eleven million and two hundred thousand, is that what you did, please answer the question?

A. Well, that paper shows a mistake in multiplication, but I

can explain that. I estimate it for four years, but the
618 reason I put it down there in round numbers, we were about five years at it.

Q. Mr. Tomkies, you undertook to multiply by four, didn't you?

A. Yes, sir.

Q. And you just made a mistake, I suppose, just like lots of times all of us do?

A. Yes, sir.

Q. And you took fourteen million there, instead of eleven million two hundred thousand, when you were multiplying two million eight hundred thousand by four?

A. No, sir; you see we were doing it for five years, and as I told you, I made it round numbers there on that account.

Q. And when you said there a while ago, that you took four years, instead of five, in order to be conservative, you were mistaken, were you not?

A. No, I don't think I was mistaken.

Q. Well, did you take four years or five?

A. You must recollect that I said I was working five years, and when the question was asked, I just made that rough estimate there.

Q. Oh, I agree with you.

A. It would be eleven million and two hundred thousand at four years, and we worked five years.

Q. Did you take four or five years?

A. Four years there.

Q. And that is what you made your estimate on, on the basis of four years?

A. Yes, sir.

Q. And that figure included all the staves that were being trucked from the boat landing to the cars while you were working for your father?

A. Yes, sir.

Q. And you don't mean to say that you individually transferred those staves?

619 A. No, sir; there were three brothers of us working, and my father was working, and nearly all the time he had two or three other men besides us working.

Q. I think you said they boated staves here for years before you were engaged in helping your father in transporting staves from the boat dock to the cars, did you not?

A. Yes, sir.

Q. You are testifying to that from your own personal knowledge, are you?

A. Yes, sir.

Q. And how many years would you say they boated the staves before you started working for your father?

A. Well, I couldn't say before just exactly. I was familiar with that time though and I would say for five years before. We lived very close there, and I could remember that. From necessity, I had to go to work early in life, and if you will look at my dates, there, I was only ten or eleven years old when I started to work.

Q. In 1895? You are not yet fifty, are you?

A. Yes, sir.

Q. Fifty years old next October?

A. No, sir; last October.

Q. I thought you were going on fifty?

A. No, sir; I am past fifty.

Q. Now did you say this Mr. Theodore Arter lived in Cleveland?

A. He stayed a great deal of his time here, but I think his home was Cleveland.

Q. Mr. Tomkies, was there a Standard Stave Company here?

A. Standard Stave Company?

Q. I don't—yes; it is Standard Stave Company.

A. I cannot remember the name. All the time we were loading there were other companies operating, and we didn't load anything like all of the staves that were being delivered to
620 the river bank. We just worked for the Miller Brothers, and one or two sawmills, I don't remember the names, but one for Mr. D. M. Meador, although later on, Mr. D. M. Meador's output was so big that we couldn't look after it and the other too, so we discontinued it, and he employed other people.

Q. But, of course, to be able to make an estimate of all the staves and lumber on the river, you must have kept a pretty close watch on all of the stave companies that were operating here, didn't you?

A. I cannot say that I did.

Q. You wouldn't think that there was any stave company operating here that you wouldn't know about, would you?

A. Well, there were companies just the same as there are today, starting up in business, operating a few months or a season, and then discontinue, and that condition exists today.

Q. Operate a little bit and then go busted?

A. Go busted, or maybe make enough to retire.

Q. Are there many retired stave dealers here now?

A. There was another company operated here extensively, and that was B. B. Burks.

Q. Yes, sir; he has been here and testified.

A. No; that was his son, he is dead.

Q. Well, both sons have been here and testified and told us all about their father's business.

Mr. THOMPSON. I object to all of that going into the testimony, the evidence of counsel; he is not on the witness stand as yet, that we know of.

Q. Mr. Tomkies, did you say you bought staves here?

A. No, sir; cross ties.

Q. How did you buy those, by the thousand?

A. No; we bought them mostly from the farmers. It was quite a custom in those days, every farmer that had a tract of timber would get out during the winter season when he didn't have farm work to do, or he would get out a lot of cross
621 ties and raft them down the river. From the mills, we bought mostly what we called pile ties, hewed out with an axe.

Q. What did you pay the farmers per thousand for ties?

A. The price averaged forty-five cents apiece for first-class ties, thirty cents for seconds, and at that time they only had two grades. They have five grades now.

The witness on Redirect Examination testified as follows:

We made a living at the stave business. I said I hauled staves for Miller Brothers and D. M. Meador, or Morgan Meador, or he was called. Meador was a much bigger operator than the Millers. We did load or hauled some for the Millers, but they had a dairy, a big farm, and also had a general store at Foss, it was called then, and is now called Bellepoint. The sawmill business was rather a side line with them, but Mr. Meador gave his whole time to that business.

In figuring on that piece of paper I made a mistake. My intentions were to figure 2,800,000 in a year for four years, 100 cars. It would have made 11,200,000 for four years, but we worked at it five years and I just put down 14,000,000. I made it five years instead of four years, but we worked for the five years, so I just made it round numbers, 14,000,000.

The witness on Recross-Examination testified as follows:

I told you that the reason I got 14,000,000 instead of 11,200,000 was because I made a mistake in the multiplication. I intended to make the computation for four years and I did not make it different to allow for five years.

The witness on Re-redirect Examination testified as follows:

When I made my calculation I was going to estimate it five years, but was figuring it four years. We have no records now. It is only a rough estimate.

622 The witness on Re-recross Examination testified as follows:

This total appearing as Defendant's Exhibit No. 1 represents my estimate, not my calculation.

DORSEY B. BARTON, by deposition, on Direct Examination testified as follows:

I will be 62 years old on the fifth of next March. I was born in Summers County about ten miles up New River. The nearest post office was Bertha. I lived there until about eight years ago next April. Bertha is on the river, but our home place, where I was born, was a mile from the river up on the mountain, but we moved down to Hinton, near the river, about eight years ago. I remember seeing Government men working on the river up at Bertha. They were cutting a channel through the shoals.

Q. Do you remember ever seeing the boats going up and down the river?

A. Yes, sir.

Q. Were you ever on the boats?

A. I have been on the bateaux.

Q. Did you own a bateau of your own?

A. No, sir.

Q. Were there any boats on the river before the channel was cleared?

A. Not to my knowledge.

Q. Were you old enough to remember that if there was?

A. No, sir. I was just a boy about four years old at that time.

Q. What is your recollection about the greatest number of boats that were operating on the river; by that I mean bateaux or keel-bottom boats, as they call them, at any one time?

A. Well, I think I have seen as many as six or seven a day, either going up or down the river.

Q. And they were going regularly up and down the river day after day?

623 A. Usually, in the summer season, they were on the river all the time then. In the winter time, of course, they were not always able to make the trip on account of the ice.

Q. Do you know how long this river, at its longest period, is frozen over in the winter?

A. I don't remember, but I think I do recall one time when I was a boy that the river was frozen over for six weeks, possibly.

Q. Generally speaking, how long is about the average time the river freezes over?

A. Well, in the last several years, it has only been frozen over a short time, but it was only in the still waters then.

Q. But you couldn't operate boats there then, could you?

A. No, sir.

Q. Ordinarily speaking, about how long in the winter would they be prevented from operating boats?

A. Well, I have known boats being run in the middle of the winter.

Q. Would it be fair to say that there are periods in the winter then it freezes over, and then melts, and the boats would start again, and then freezes again?

A. Yes, sir; it freezes over sometimes three or four times in the winter.

Q. But during the summer, fall, and spring, boats could run on this river most any time?

A. Yes, sir.

I remember a boat on this river which was called the "Cecelia." I have seen it running, but never rode on it. It passed my place, I don't remember hardly how often. The best I remember this boat was built with side wheels, paddle wheels, had a roof over it, and had seats fixed for passengers. I just saw the "Cecelia" from the bank. I saw it the day that it made the first trip. It was quite a show to the folks up there in the country and everybody went to see it.

It was about fifty-eight years ago when the channel was
624 cut, and I don't remember when the bateaux were put in.

Q. How recently do you remember seeing boats running on the river?

A. Well, I think, possibly, there was a boat running ten years ago; that was just a little while before I moved down here to Hinton.

That boat came to Hinton and went up the river. I think it hauled stuff up the river about twenty-five miles from here to Shanklin's Ferry. That boat was run by the Lilly boys, Ed Lilly and B. H. Lilly, his brother. They lived up in the country in Pipestem district. They carried lumber and staves in their boat and I think they were boating them down here to Hinton. I don't think that it has been longer than ten years ago since they quit that boat. I can't remember when they started to run it, but they worked on the river for years and years.

I am familiar with what was transported by bateaux going up and down the river. They carried staves, lumber, and farm products, and I have seen corn, wheat, tobacco, loose hay, and other produce being transported down to Hinton.

Q. Have you any knowledge of any commerce being carried back up the river?

A. Yes, sir; they done quite a little bit of hauling for the country merchants and farmers, in the way of supplies and things of that kind.

Q. Did you ever see any bateaux yourself, with these articles you describe on it?

A. Yes, sir.

I rafted some cross ties down the river myself from Bulls Falls for myself and also for other people, including Gore Brothers, who cut a set on my farm—I think about five or six thousand cross ties. I helped them run the ties down here where they were sold to the Chesapeake and Ohio Railroad.

Q. Can you name any other person who brought lumber and cross ties down here?

A. Yes, sir.

625 Q. Who was it?

A. Hense Buckland, he cut a set of staves close to me in a mill there on my place, and he cut—oh, I don't know how many thousand, but it was a set of staves.

Q. Did you help him bring them down the river?

A. No, sir; but I saw him haul them down to the river.

Q. Do you know of your own knowledge that they did come down the river?

A. Yes, sir.

Q. Where to?

A. Here to Hinton, where they were loaded on the cars.

Q. What railroad?

A. C. & O. Railroad.

Q. Is there any other person you can name, close——

A. (Interrupting.) Who manufactured lumber?

Q. Yes, sir.

A. Well, Burks over here in the Sheriff's office, he manufactured lots of lumber.

Q. What are his initials?

A. Z. Burks—Zina V. Burks.

Q. And he carried them down himself, or did you do that.

A. No, sir; I didn't carry them down. He manufactured them, and I know they were boated down here.

Q. Did you see them brought down?

A. Yes, sir.

Q. And they were brought here to Hinton?

A. Yes, sir.

Another man I can name up there was old man Maxwell, who used to live here, but is dead now, I think. I don't believe I remember his initials, but his name was Bob. He operated from Shanklin's Ferry and boated down to Hinton. I did not help him or any of the others I named bring stuff down to Hinton.

There has been many others. There is a fellow Farley
626 lives up there at Crump's Bottom, he manufactured lots of lumber there ten or twelve years ago. I bought lumber from him when I built a house up there on the river and when he operated a mill just above Bull Falls.

I know John W. Bradberry, who has been located up there on the river for over fifty years. He didn't handle lumber, but he used to raft ties down here from where they were manufactured on the river from Bulls Falls and along in there.

I know Mr. L. D. Neely who is located near Bertha. He manufactured lumber up there which he shipped down the river.

I know Mr. W. D. Eanes. He shipped lumber down the river. I think he ran a bateau. I know he done a lot of work on the river—rafting, and so on.

I know Mr. J. O. Pettry, who lived up in the country at Bulls Falls. He manufactured lumber up there. The most of the work he did was rafting ties. He shipped some down the river.

You asked me about a man by the name of W. G. Farley, and about a man by the name of Joe Farley, and John Webb who is dead. Webb was located at Bertha. He was not in the lumber business. He lived on the river, but I don't think he ever rafted or worked on the river.

I know Harry Medley who was located near Bluestone, about five or six miles from here. I don't remember J. E. Robes. I know J. H. Medley. He was located down in this country somewhere, but I don't know just exactly where. I recall his being on the river. He ran a bateau.

I remember B. D. Trail. He was located at what we call Pipestem, which is ten or twelve miles up the river here. There were two John Bradberrys. One of them is dead. He is the one who used to run a bateau so much on the river.

I remember W. R. Vest, and a firm, Vest & Neely. They shipped lumber on the river down to Hinton.

I know T. B. Ballard. He lived at Indian Mills, two miles from the river. He had a mill and shipped lumber down the river. Replying to your question whether I know H. M. Dickinson, I know Mr. Dickinson, but I don't remember his initials. I know J. H. Dickinson and Laman Dickinson. He was his son. I don't remember H. M. Dickinson. Replying to your question whether I know J. G. Anderson, I know Anderson, but there are so many Andersons, and I don't know his initials. I know him by the name of Jabe Anderson. He lived at Mercer Salt Works. He handled lumber on the river.

I remember R. G. Houchins who lived about a mile from Bulls Falls. He was not engaged in the lumber business, but he was on the river all the time in the summer, rafting ties.

The witness on Cross-Examination testified as follows:

In each instance in which I have testified about boats, I mean bateaux.

Some of the men about whom I have testified who lived at various places up the valley from Hinton lived on farms, but most of them did not own farms. Most of them made their living by working on the river or anything else they could get. Houchins had a farm, but he worked on the river. A lot of those farmers up the river pieced in by cutting ties and selling them. A good many of them cut ties on their farms and sold them, but I would say that a hundred thousand feet of cross ties were cut and rafted down here.

I lived about five miles from Bluestone. I have been along the river near there lots of times. I never waded across the river at Bluestone. There used to be a ford there, but it is pretty deep. I have never seen anyone wade across there at Bluestone. Some persons might have waded at the ford, but it is pretty deep. I saw the river around Bellepoint along about the thirteenth of December of this year. We had a right smart stage of water about that time, but I don't remember the date.

Q. Well, you didn't happen to be observing it at that point on the 15th day of December, and see a tractor being driven across the river at that place, did you?

A. On the 15th day of December of this year?

Q. Yes, sir.

A. I wouldn't be surprised, because I know they were having a time getting a tractor across there, but I was not down there, because I was working away from there, but I know they were trying to get a tractor across the river, but they just told
628 me about it, and that is only hearsay, because I didn't see it myself.

Q. You don't want to give any other impression that it was anything else but a man driving a tractor through on its own power, do you?

A. Well, I don't know how they got it across, for I was not there.

Q. Well, I want to be fair with you, and I don't want to leave you giving the impression, any impression, that you would not be willing to assume the responsibility for.

A. I was not there, as I told you, and what I would tell you about it would simply be hearsay.

I was born near Bertha less than a mile from the river, up on the hill overlooking the river. As a small child I could see about four miles of the river. There was a kind of a horseshoe bend and I could see the river on both sides. I couldn't tell how long I saw bateaux on the river after the Government improvement. I was born in 1874.

I remember seeing the Cecelia quite distinctly. We could hear it coming and it was quite a show to us you know and we would

have plenty of time to get to the river to see it and I was right there when it landed at Bertha. I have described its appearance, inside and out, as nearly as I can remember it. I was four or five years old at that time, or something like that.

Q. Don't you remember that the Cecelia was built and first run in 1878?

A. I couldn't tell the exact date, because I was very small and don't remember.

Q. I was just verifying the fact that you were that old.

A. Yes, sir.

Q. Have you ever seen the picture of the Cecelia, since that time?

A. No, sir.

The witness on Redirect Examination testified as follows:

The Cecelia had a whistle and we could hear it and when it come around Bluestone everybody would come and see it. It was quite a show, because the hill-billies up there had never seen anything like that before.

629 W. C. RATCLIFFE on Direct Examination testified as follows:

By deposition:

I was born in Montgomery County, Virginia, at Graysontown. I am 59 years old. I have lived at and near my place of birth and in the vicinity of New River all my life. I've never lived anywhere else. I think we come to Radford when I was about seven years old and have lived here ever since. I have seen a couple of boats on New River.

Q. State if these boats were carrying anything on them?

A. I could not say what they were carrying. I know I seen ties on the boat once, they belonged to Mr. Hodge. I was just a small boy then, that is all I can say, that I ever seen carried on boats, that I can remember, except my grandfather said they used to haul down Little Creek on boats. He was running a mill.

By Mr. FORBES. We move to strike out what his grandfather said.

I seen one boat put in the Little River it came down. This boat was launched at Graysontown four miles from New River, on Little River. Graysontown is three or four miles from Little River at the point where it flows into New River. I couldn't describe that boat distinctly to my knowing, I was eight or nine years old. They said Mr. Craft built it to haul flour down Little River on.

(Defendant objected to the statement of the witness as being hearsay evidence and moved to strike it from the record.)

I knew Joseph Craft. I did not see the boat during the process of building, but I saw them put it in the river. I could not say what its exact length was, but it looked to me to be between twenty-five and probably thirty feet long. I suppose it was eight feet wide, maybe six or eight. I never seen any boats at Snowville which is about a mile above Graysontown.

I know of a place up New River called Mack's Creek Furnace. It is a pig iron furnace. I have been at the furnace when I was a boy many a time. My grandfather run a mill there. His name was William Ratcliffe. When I was at the furnace, I could not tell whether it was making pig iron or not, my uncle was foreman there, but I didn't go up to the furnace. The mill was about a mile down. The mill was grinding corn and wheat. I did not see where this corn and wheat went. I could not
630 say I have seen any pig iron on boats floating down the river. My grandfather did not launch any boat at Graysontown. He was not there, he was at Max Creek. The mill was on Max Creek and not over a mile from New River, I could not say positively. There was quite a bit of timber standing up New River in the region from Radford up to Max Creek when I was a young man. I don't recollect that there were any sawmills up there at that time. I never was along the river in them days. I was small. I lived on Little River then.

Q. In your later years, do you know of any lumber being brought down New River, not when you were a boy, but later on?

A. Yes, sir; I have seen lumber brought down New River.

Q. On what kind of craft?

A. Something like a keel boat.

That is a boat which they run by poles and a paddle at the end to guide it. I don't know how long it was, maybe thirty feet more or less. I have seen lumber come down on it, but I could not say whether I have seen lumber come down on it more than once or not. I seen ties come down once. I was down here at New River Depot when they passed. I have no idea where they come from. I just seen them on the boat. I don't know whether the boat was tied at the wharf at New River Depot or not. The ties were on the boat and it was standing there anchored at the wharf. This was the same boat I was speaking about. I don't know how many men it took to operate it. There were always several men with it. I believe I was about nine years old then. It was along after I came to Radford. I came here when I was seven. I am fifty-nine years old the seventeenth of April.

Q. You were born about '75 or '76, then this would be in the early eighties, would it not, when you saw this boat?

A. In my childhood days.

Q. It was a year or two after you came to Radford?
A. I could not recall just how long it was.
Q. How long, would you say, two years after you came here?

631 Q. Do you recall saying awhile ago if was some two or three years after you come down here?

A. I said something about two years. I could not recall.
Q. You were seven when you came down here?
A. It might have been just after I came here; I know it was when I was a small boy.
Q. Somewhere between the age of seven and ten years?
A. I could not say how long it was after I got to Radford, because it may have been a year or may not have been that long, or it might have been two. I can't recall.

The witness on Cross-Examination testified as follows:

Q. I understood you to say you remember seeing two of these bateaux in your time?
A. No, sir; I seen another little boat here. You mean two of them boats?
Q. Yes.
A. I recollect one keel-bottom boat.
Q. I understood you to say that was launched about 3 or 4 miles above the mouth of Little River at Graysontown?
A. No; I didn't say it that way; I said I seen one put in there by Mr. Craft. I don't know that was the same boat or not; that was before I come to Radford.
Q. That one you saw put in there was about four miles above the mouth of Little River?
A. Something like that; yes, sir.
Q. Mr. Ratcliffe, do you know where the dam site is with reference to Little River?
A. Yes, sir.
Q. Was this above the site of that dam?
A. Yes, sir.

Q. So the dam is between the place where this first boat
632 you mentioned was placed in the river and New River; is that right?

A. Yes, sir; the dam is right about a quarter or half a mile from the mouth of Little River and this was about four miles up.
Q. And it was Little River in which that boat was put?
A. Yes, sir; the boat I seen put in there when I was a boy.

JOHN LIKENS, by deposition, on Direct Examination testified as follows:

I reside in the east ward of the City of Radford; that is, East Radford. I came here in 1862. I will be eighty-one the thirteenth of February. I have lived here practically all my life. I built a house here forty-three years ago and I am living in it today. I am fairly familiar with this New River which runs by Radford. I see it all the time.

Q. State whether or not you recall seeing men working on New River some fifty or sixty years ago?

A. Yes, sir.

They began working down here at Dudley's Ferry and worked up the river. Dudley's Ferry is right down below the state highway bridge. That ferry has been there ever since I can first remember. It was used as a ferry from the time I first came here until they got a state bridge across, about thirty-eight years ago. Before the bridge was put across they used this Dudley's Ferry. The only other way to get across the river was to ford it below the falls which were five or six hundred yards below the ferry. This was right below the falls. They used the ferry all the time until the bridge was put in, but not since, although little skiffs do pass back and forth as ferry boats since the bridge was built. Before the bridge was put up, they used a common old ferry boat made out of timber which could take a two-horse wagon and automobiles across. In them early days they did not take automobiles. I have seen the ferry running back and
633 forth across there. They carried most everything that farmers had that was haulable—wheat, grain, plows, and everything. They used to send a few stock, that is, animals across in the ferry boat if they didn't go up to the ford and drive them across. I suppose that merchandise went across in two horse wagons. I have seen such wagons on the ferries about as much as you did back in the country where people used to transport in two-horse wagons. The cows and things taken across on the ferry came from the side to the railroad to the depot away back from Giles and everywhere. Farmers brought all their stuff in. Most all the stuff was shipped here to the depot and they come after it. Anything they shipped they put in the station at the depot and sent it East and to Philadelphia and Baltimore. The things they brought on the ferry were put on cars and shipped away.

I have seen men working on the river right down here below the riffles of the falls as you call it. They were blasting out. saw them working nearly four miles up there.

In addition, I saw little keel-bottom boats on the river which they pushed with a pole. They were twenty to thirty-five fe

long and always had two men in the side pushing with poles when they went upstream.

Q. How would they come downstream?

A. I suppose in eddy water they would push it too.

Q. When you would see it how would it come down?

A. It would float itself, but that didn't last long, that channel filled up with gravel and stuff and didn't last a year. It filled up and didn't amount to anything.

I suppose it was the motion of the current that filled the channel. As long as the channel was open, boats rode up and down there for about twelve months maybe. These boats carried a little of everything. They hauled lumber, and they hauled some pig iron from away up the river down from this old mine across the river, and took a two-horse wagon and loaded it on cars and shipped it off north somewhere.

The pig iron which I saw come down come out of the furnace in bars about three feet long. That didn't amount to noth-
634 ing, and the pig iron and the boating soon give out.

I don't think the capacity of those boats was over four tons. I think one might haul four tons. That would be my estimate now. The boats got this pig iron at some ferry away up the river here. I forget the name of the ferry. I did not go up the river to see it. I know that is where they got it.

The farmers would haul the lumber and other things down and sell to the people. They didn't haul over two or three wagon loads in a boat.

Q. Ever see any cross ties on these boats?

A. I have probably seen a few on the other side of the river, close to the railroad.

The river was a bad one for rafting. The rocks and falls would tear the raft all to pieces.

I knew a man by the name of Richard Gillam. He is the man who was in charge of the Government men in the work of cleaning out that channel.

It was way back yonder, over fifty years ago that these twenty-five and thirty-five feet boats carried pig iron and other things. I don't recall exactly what year it was.

I know a railroad called Cripple Creek. It goes southwest from Pulaski. I don't remember when it was built. Some of the iron ore which was hauled on it went to Pittsburgh, Pennsylvania.

C. E. Roop, by deposition on Direct Examination, testified as follows:

I will be 84 years old the 23rd of this month. I was born in Pulaski County a mile or two from Snowville on Little River. I have lived in the County all my life and on New River two or

three years. I lived on New River two or three miles from the mouth of Little River on Captain Moore's place, which used to be the Old Cloyd place up above Have Howe's place. Then I lived on Dr. Clark's place up there. That is twenty miles upstream from here I think. It is five or six miles downstream from Allisonia. It is in there about Dalton.

When I lived at Snowville I saw keel bottom boats built there. I suppose they were fifty feet long and six or eight feet wide at the top. The bottom of these boats was sorter round. I
635 remember one of the workmen in the building of these boats was Joe Craft. He was the main man. He worked for Mr. Grayson and lived at Graysontown. I think old Johnnie Grayson had one or two made.

I seen them same boats on New River from Radford to Allisonia. I saw them right near Allisonia anywhere up there within a few miles, and I would see them come down the river. They were carrying pig metal mostly. I have also seen them carrying lumber and I think I have seen them hauling a little wheat and a little corn. I have seen them right here at Radford.

I have ridden on boats of this kind, and helped push them, too. I worked on them just a little. I would get on and help the boys push a little for pastime when they would pass. There was metal on these boats when I was on them. I don't know whether I have ever seen any logs on a keel-bottom boat. I have seen keel-bottom boats with metal and lumber and other things on them, but not logs.

I have seen rafts on the water but not on boats. I saw one raft of logs start up here above Captain Moore's. I helped put it in the river at Have Howe's place. It consisted of forty or fifty logs tied together. I got on and rode down river to Ingle's Falls, where the raft busted and I fell in the river and pretty nearly froze to death. There was snow on the ground. These logs were delivered to this old mill across the river. Ingle's Falls is a mile or two from here upstream and just above the pipeshop, I think. The raft broke up there. The logs were taken to the sawmill up on the bank of the river and sold there.

I think that the pig iron which I saw boated was made up there about the river hills, up there close to Allisonia, but I am not sure of that. I think there was a furnace in there.

I have been at Mack's Creek. There was a furnace at which I have seen pig iron being made. The pig iron that was made there ain't the pig iron that passed Clark's place up there. Mack's Creek is below there, below Allisonia, down the river. It is below where I lived. I don't know the name of the other furnace I mentioned. Allisonia is above Mack's Creek on the river. I don't know whether the other furnace which I spoke

of was above or below Allisonia. It's in there close somewhere. I expect it was Boone Furnace.

636 The iron ore I saw come down here came to West Radford, I believe. I don't know. I said I got on and rode a little piece on the boat and walked back home—like a boy will walk a mile to get a ride for a half mile. I know that pig iron came down as low as the lower end of Dr. Clark's place—that is—at Jones' Ford. I know it came that far but I didn't come all the way with it. I rode that far.

There was no railroad between there and Radford then. They just commenced making it.

The witness, on Cross-Examination, testified as follows:

Q. Counsel for the other side asked you something about the boating of iron ore down the river. You never saw any iron ore boated on the river, did you?

A. I don't know that I seen iron ore.

I wasn't born on Cherry Branch, but I lived there pretty near it all my life. I was born right in the neighborhood there. It is fifty-four or fifty-five years since I lived on Dr. Clark's place. I lived there about eighteen months. During that time I saw pig iron boated.

Later I lived down river at Captain Moore's place. It went by the name of the Old Cloyd place. They used to call it Dunkard's Bottom. It's been forty-four or forty-five years since I lived at Captain Moore's place. I don't think I saw any pig iron boated when I lived there.

It was only during the period in which I lived on Dr. Clark's place and before that time that I saw pig iron boated on the river. They was boating some before I went there. When I moved up there I farmed on the river and was right on the river all the time. I think I saw four or five boats up there, maybe six. Not more than that. I don't think they made very many boats.

Q. Who operated those boats, do you recall?

A. Well, the ones I rode on and knowed the most about was Whitt Tate and Eddie Floyd. They was two darkies and there was another old darky who lived on the road back over to Hayne's Ferry. I forget his name. He is gone a long time ago.

637 I seen the boating being done at different times in the year—whenever they could get water enough to run the boats, I think. I have seen many times when my dogs could cross there and not get their backs wet. I was a hunter and hunted on both sides and when I would ford it the dogs would follow me.

I seen one boat broke in two on the river one day and they had a whole lot of trouble getting it out. They couldn't keep it in the sluice and there was a little tide and it hit a rock. I wasn't on that boat.

I never rode on one of those boats from up there to Radford. I just rode a little piece at a time on the boats. I would catch them along up the river somewhere about the mouth of Little River and get on and ride a little piece and get off and walk back. I don't think the boating kept up longer than just a few years—four or five years, I would say. I don't know that I know that.

I seen the boating when I lived on Dr. Clark's place. I seen the boats run as long as I stayed there. We come to Radford nearly every day and I would see them on the river going and coming when there was tide enough to run—every two or three days.

Q. You don't mean that the boating from Boone Furnace kept up for four or five years?

A. And I am remembering a long time back, too.

Q. You are not willing to say that the boating lasted four or five years, are you?

A. Well, there was a heap of it that lasted longer than that. There was boats on the river longer than that. Men got to trading on these boats and I think the boats was bought and sold maybe to different people—just for farmers and people who wanted them to do a little work for themselves.

Q. I am talking about the boating of pig iron from up above Allisonia. I believe you were lead into saying that it was from Boone Furnace by counsel for the Government. I want to know whether you mean that the boating of pig iron from Boone Furnace continued for four or five years?

638 A. I don't know whether that did or not, but as long as I was on Clark's place it come down the river.

Q. Which was in about 1881, wasn't it?

A. Well, you can count it yourself, count back from fifty-five and see—54 or 55.

The witness, on Redirect Examination, testified as follows:

I said the iron ore came from Boone's Furnace as I saw it going down the river. I know it come from there as long as I stayed there and then after I got away from there it might have come from Mack's Creek. I have seen it on the river up here. They had a furnace below there at Mack's Creek.

I didn't see the boat which I spoke of breaking in two, but I seen it on the riffle after it had broke. I heard that the men had trouble on the boat and seen it on the riffle before they moved

it away. I think that is the only boat that broke that I ever heard of.

These dogs which I used to have for hunting were about knee high to a horse. I think my horses would cross there and not get their knees wet. I farmed the island down there at Jones' Ford and was down there from the time I went to plowing in the spring until I shocked my corn in the fall.

It was when the river was low that the dogs would cross the river. There were plenty of times when dogs couldn't get across without wetting their backs and horses couldn't get across without wetting their knees, but heaps of times they could.

Q. During the time when the water was high enough the boats would come down and go up the river?

A. I think so when there was tide enough to run them.

I testified that I would get on a boat at Little River and ride up New River, perhaps half a mile, and then I would get off on the bank anywhere it suited me at a good place to land.

The witness on Recross Examination testified as follows:

I have forded New River elsewhere than Jones' Ford. I forded
639 up at Captain Moore's place and at the old Woolwine place, which is in there below Have Howe's. I forded it right up there at Clark's old mill nearly a mile from Jones' Ford up the river and I would get in swimming water sometimes. There was no ford there but I would make one and sometimes I would get in swimming water for my horse. I have forded the river down at Ingle's Ford. I never forded the river at Allisonia.

The witness, on Redirect Examination, testified as follows:

Sometimes I would get in water in which my horse would swim. I don't think his feet could reach the ground, but he might have touched the ground with his feet once in a while. There were places at which I crossed where my horse actually had to swim and where I have pulled my clothes off and swam across. I got in swimming water at Clark's Mill. I also got in swimming water in fording up at Captain Moore's but I reckon I missed the ford.

(Exhibit 30, being photostatic copies of pp. 994–995, of "Index to Reports, Chief of Engineers, U. S. Army, 1866–1912," was offered in evidence.)

Defendant objected to the admission of Exhibit 30 on the grounds that the same was incompetent, immaterial and irrelevant.

(Exhibit 31, being photostatic copies of pp. 52–64 of Report of Secretary of War for year 1873–Vol. 2, including underlying reports of Major Wm. P. Craighill, N. H. Hutton, and C. R. Boyd, was offered in evidence.)

(Exhibit 32, being Moore and Briggs Report of 1819, was offered in evidence.)

(Exhibit 33, being photostatic copies of pp. 62–63, 331–332 of Report of Chief of Engineers of 1877, was offered in evidence.)

(Exhibit 34, being photostatic copies of pp. 69–70, 495–499 of Report of Chief of Engineers of 1878, was offered in evidence.)

(Exhibit 35, being photostatic copies of pp. 79–81, 530–545 of Report of Chief of Engineers of 1879, was offered in evidence.)

(Exhibit 36, being photostatic copies of pp. 107–108, 676–681 of Report of Chief of Engineers of 1880, was offered in evidence.)

(Exhibit 37, being photostatic copies of pp. 144–145, 904–911 of Report of Chief of Engineers of 1881, was offered in evidence.)

(Exhibit 38, being photostatic copies of pp. 140–142, 912–919 of Report of Chief of Engineers of 1882, was offered in evidence.)

(Exhibit 39, being photostatic copies of pp. 144–145, 699–705 of Report of Chief of Engineers of 1883, was offered in evidence.)

(Exhibit 40, being photostatic copies of pp. 149, Part I, and 928, Part II, of Report of Chief of Engineers of 1884, was offered in evidence.)

(Exhibit 41, being photostatic copies of pp. 287–288, Part I, and page 1859, Part III, of Report of Chief of Engineers of 1885, was offered in evidence.)

(Exhibit 42, being photostatic copies of pp. 281–283, 1599–1602 of Report of Chief of Engineers of 1886, was offered in evidence.)

(Exhibit 43, being a photostat of a typewritten copy of pp. 302–303, 2430–2433 of Report of Chief of Engineers of 1891, was offered in evidence—with asterisks being added at the request of the defendant at page 17–c of the Exhibit after the offer of the exhibit by the plaintiff, to show the omission of one paragraph from the exhibit, which omission the exhibit as offered by the plaintiff failed to show.)

(Exhibit 44, being photostatic copy of p. 379, Part I, of Report of Chief of Engineers of 1897, was offered in evidence.)

(Exhibit 45, being excerpt from "The River and Harbor Appropriation Act" of June 13, 1902, was offered in evidence.)

(Exhibit 46, being a letter dated February 19, 1913, from the Secretary of War to Congress transmitting the Altstaetter, Rossell and Bixby reports re examination of New River from Radford, Va., to Hinton, W. Va. (House Document 1410—62nd Congress, 3rd Session—1912–13), was offered in evidence.)

(Exhibit 47, being a letter dated April 18, 1913, from the Secretary of War, in response to a resolution of the Senate of April 8, 1913, and copies of all papers, correspondence, rulings, permits (without maps), etc., of record in the Department pertain-

ing to the construction of dams or reservoirs by private parties in New River, Va. and W. Va., was offered in evidence.)

By Mr. BAKER. If this is a convenient time I would like to bring up a matter about which we are necessarily concerned on our side. I wrote to the Secretary of War and asked him to make available some engineers, officers, the District Engineering Officer and his predecessor. I received in reply a statement from him that he could only do that upon a request from your Honor, and I asked your Honor to make that request, and I am told a reply has been received, which at least negatives a part of the request. I don't know what the answer to your Honor is, but it is important to us, in the preparation we have to make to meet the plaintiff's case, to know how far we have to go, and I thought perhaps if your Honor would indicate to us what limitations the Secretary of War has felt necessary to put upon the attendance of these witnesses, perhaps counsel on the other side might take it up with the Secretary of War, through the Attorney General, and supplement our request.

By the COURT. I didn't read the letter I received with any great care, but it is my impression there are no limitations or conditions in the letter at all, but simply the Secretary expressed the view it was not fitting that officers of the U. S. Government should testify on behalf of an adverse party in a suit in which the Government was a party. That is what I understand his letter to mean, and he declined to make them available. The letter is somewhat lengthy, but I think that is the substance of it. I will let you look at the letter. (Letter handed by the Court to Mr. Baker and Mr. Thompson.)

By Mr. BAKER. Perhaps we might consider this and bring it up again if we have any further suggestion to make a little later.

By the COURT. All right.

By Mr. GATCHELL. In this case, one phase of the Government's case rests upon the variations of the flow occurring in New River, and the Kanawha River. An experiment was conducted in 1930 dealing with variations in the flow of New River and the Kanawha River, and for the purpose of presenting the basic facts, we desire to introduce at this time certain charts which are the bases upon which subsequent testimony will be presented by expert witnesses. I make this brief explanation so the nature of the presentation may be a little more intelligible affecting the subsequent record.

640 WILLIAM KESSLER

Direct Examination by Mr. GATCHELL:

Q. Will you state your name and address?

A. William Kessler, 13 Curry Street, South Charleston.

Q. What is your occupation?

A. District Engineer of the Geological Survey.

Q. How long have you been District Engineer of the Geological Survey?

A. Since June 1929.

Q. In what territory have you been located; what does your territory embrace?

A. The State of West Virginia, and the Ohio River basin, which includes the Kanawha River.

Q. In what state?

A. West Virginia.

Q. Were you District Engineer in charge of this territory in the year 1930?

A. Yes; I was.

Q. I show you a chart marked for identification Government Exhibit #48, entitled "Kanawha River at Kanawha Falls, West Virginia, January 24, 1930 to March 11, 1930." Was that secured under your supervision?

A. It was.

Q. What do the vertical lines or the ordinates represent on this chart?

A. The vertical lines represent the gauge height or elevation of water surface above an arbitrary datum.

Q. What do the horizontal lines represent?

A. Time.

Q. How was this chart prepared?

A. This chart was prepared by a recording instrument in the field, which operates automatically.

Q. Was the entire process mechanical?

641 A. Yes, sir; except the clock has to be wound up at regular intervals.

Q. And where was that recording instrument located?

A. This instrument was located in a well on the river bank at Kanawha River at Kanawha Falls.

Q. Do you know this is a chart taken from the gauge at Kanawha Falls?

A. It is.

Q. What, in brief, does this chart purport to show?

A. This chart records the elevation of the water surface above the arbitrary datum for the period January 24, 1930, to March 11, 1930.

Q. I notice on this chart straight pencil lines drawn between certain points on practically every day, overlapping the curved pencil lines. What does that represent?

A. They were drawn in the office after the chart was removed and was our office method of computing the mean gauge height for the day.

Q. What was the curved line put on there to represent?

A. The actual graph drawn by the instrument.

Q. I notice pencil figures at the bottom of this chart just above the date. What do those pencil figures represent?

A. Those pencil figures represent the mean gauge height for each day.

Q. There are penciled notations and ink notations on this chart appearing vertically on the chart; what do those notations represent?

A. Those are field notes made when the instrument is either set at the beginning of the record or sometime during the record when it is inspected.

(Exhibit 48 offered in evidence.)

Q. Does that chart approximately show the stream flow of the Kanawha River at Kanawha Falls?

A. It shows the gauge height.

Q. I show you another chart entitled "Kanawha River at Kanawha Falls, West Virginia, dated March 11, 1930, to April 5, 1930," and ask you if that was prepared under your supervision?

642 A. It was.

Q. And is it similar to the chart which you have just identified?

A. Yes, sir; it is similar and just continued it, for the next period.

Q. Was the method of preparing that the same method as that of preparing the other chart?

A. Yes, sir; identical.

Q. And simply continues for the period following the one for the preceding chart?

A. That is right.

By the COURT. Those charts, as I understood it, Mr. Kessler, simply undertake to show the water level at Kanawha Falls, the height of the river we will call it?

A. That is right.

By the COURT. From day to day and I suppose from hour to hour?

A. Yes, sir; a continuous line.

By the COURT. Over the period the chart purports to cover?

A. Yes, sir.

By the COURT. It doesn't undertake to deal with the volume of flow in the river?

A. Not at all.

Q. What is the time interval shown on this chart?

A. What do you mean by that?

Q. How much time elapses between each of the vertical lines?

A. The time scale of 2.4 inches per day for twenty-four of these spaces, so each space is one hour.

By the COURT. The paper you use is divided by inches into ten?

A. It is 2.4 inches between the midnight and midnight lines, divided into twenty-four hours. Each one is $\frac{1}{10}$ of an inch.

(Said chart, exhibit 49, offered in evidence.)

643 Q. I show you a chart entitled "New River at Caperton, West Virginia, dated January 25, 1930, through March 10, 1930," and ask you if that was prepared under your supervision?

A. It was.

Q. And where was the gauging station located from which that chart was made?

A. This was located just across the river from Caperton.

By the COURT:

Where is Caperton?

A. It is about ½ mile upstream from Elverton, that is the nearest town, roughly about ten miles above Hawks Nest Dam, upstream, as far as I remember.

Q. Does that place it in the gorge?

A. Yes, sir; right in the gorge.

Q. Were the methods used in preparing this chart similar to the methods used in preparing the two preceding charts?

A. Yes, sir; the same type instruments used.

Q. And same notations made in your office?

A. Yes, sir; same notations in the office.

Q. Are there any corrections on this chart?

A. No corrections to be applied on this chart.

(Said chart, exhibit 50, offered in evidence.)

Q. I notice on Exhibit #50 pencil notations "OG 3.5 1:35 PM IG 3.47 2-16-30 Rex E.B." Will you explain that notation?

A. That is—OG 3.5 means outside gauge reading 3.5 feet, IG is inside gauge reading 3.47 feet, and the correct time by his watch was 1:35 PM, date February 16, 1930, and Rex E. B. was the name of the man who inspected the chart. I don't recall his name.

Q. What would you understand from such notation?

A. That was a field inspection of the recording instrument to see if it was operating properly, and to determine what the corrections should be at that point.

. Are periodic or irregular inspections made of these stations?

A. They are irregular.

Q. Is a notation made on the chart every time it is in-cted by a field inspector?

. I would say practically every time.

. Now there are also pencil notations on Exhibit #50 appear- in particular in the period from March 7 through March 10, he upper portion of the chart. Do those pencil figures have significance?

. Those pencil figures are office computations to show the mean harge for the day. The mean height does not give the mean harge for the day so we have to divide the day up into a ain number of periods to get the average discharge.

. Immediately under the curved line appear pencil figures. at do those indicate?

. Those represent the mean *guage* height for the day.

. Do they represent the stream's flow?

. No; they do not.

. In order to interpret these figures shown at the top of the e in columns, what do they mean with respect to any one day, you show that?

y Mr. GATCHELL. Counsel for defendant suggest that it might asier to simply state with their consent we are not offering to ve any stream-flow records by these charts, and I was trying how by Mr. Kessler these figures given on the top of the rt, while they may be stream-flow figures, you would have to through the computations to determine them, and he is not mpting to do that.

y Mr. JACKSON. Those figures are not included in anything vn by these exhibits?

y Mr. GATCHELL. That is right.

. I show you an exhibit marked for identification Government ibit #51, entitled "New River at Caperton, West Virginia, n March 12, 1930, to April 4, 1930." Was this chart prepared r your supervision?

It was.

Is it similar to the chart you have already explained?

It is.

What does it purport to show?

This shows the elevation of the water surface above an rary datum at Caperton.

I notice on this chart a solid pencil line traversing the chart horizontal direction, and a broken line on the reverse side of chart. Will you explain what that broken line indi- ?

645 A. Well, I think I had better start with the solid line. This recorder was set at eleven o'clock on the 10th of March, and it drew a graph until about noon of the 11th, then the mechanism got out of order and the paper apparently stood still while the clock still ran, and it did not draw a true graph as far as time was concerned, but did as far as gauge height was concerned, and I have inked in on the back of the record my interpretation of the true graph as it would have been drawn.

By the COURT. How long did it stay out of order?

A. It stayed out of order until the 12th of March; no, until the 14th of March.

Q. Do I understand that during this period the gauge was out of order, the correct elevation of the stream as recorded at the gauge was shown on this chart, but the time interval was not correctly shown?

A. That is right.

Q. And what were you correctionns designed to do?

A. My corrections were designed to show the true graph as it would have been drawn had the instrument not been out of order with respect to time.

Q. There appears on here, above the date, March 14, an ink notation reading, "Note-Record NGA to G Graph reconstructed through A prime, C prime, d. prime, d prime, f, prime, g. prime." By whom was that note made?

A. I wrote that.

Q. At what time did you write that note?

A. At the time I drew this graph in on the back.

Q. Were there any other corrections appearing on this chart?

A. No; no corrections due to errors of the instrument. Another point, on the 18th of March the recorder again went out of order, the same reason, and it was correct again on the 20th, and I reconstructed that graph also in the same manner with the dashed line on the back.

646 Q. Were these corrections made shortly after the graph was removed from the *guage*?

A. I don't recall just how soon it was.

Q. Was it in a month or six weeks or two months?

A. Now, I could not answer that because we do not work up our records as a rule until sometime after the records are removed.

Q. Was it worked up in 1930?

A. It was worked up in connection with our computations of our 1930 progress report.

Q. When was your 1930 progress report submitted?

A. Probably about March 1930.

A. And to whom was that progress report submitted?

A. That is submitted to the Washington Office of the Geological Survey.

Q. I note at the end of this chart a statement, "5.10 intake plug out 4.60 clock stop added by WK, Pen 5.13 MTT intake flushed." What does that notation mean?

A. That was field inspection by Mr. Thompson, and he found the intake pipe was plugged so the gauge inside the well did not read the same as the gauge outside, and he flushed it with the flushing mechanism we have in the well.

Q. How did that affect this graph?

A. Why I had to estimate the gauge height as it would have been drawn for that one day.

Q. And how did you estimate that?

A. In this case it was drawn in, you might say, by experience, and also by the maximum and the minimum gauge height as drawn by the pencil which left its trace here.

Q. And upon what basis did you estimate the correct reading of that gauge did you use any other gauge or figures?

A. As I recall, we didn't make any corrections due to that intake pipe being plugged up, because it meant it was just
647 lagging slightly, it wasn't completely closed, but just a slight lag in this record.

Q. Mr. Kessler, in computing stream flows do you use these gauge-height readings you have just described?

A. Yes, sir; we do.

Q. And what other figures do you have to have in order to determine the flow of a stream?

A. We have to make discharge measurements. The usual manner is to use a current meter.

Q. Is there any other chart you have to have for the purpose of computing stream flow?

A. Yes; we have to determine the rating curve for that station.

Q. What is that?

A. A graphical representation of the relation between the gauge height and the discharge.

Q. I show you a chart entitled "Rating curve of Kanawha River at Kanawha Falls, West Virginia," on which appears several curves. Will you explain what the vertical lines mean on this chart?

A. The vertical lines are the gauge heights or elevation of the water surve above the arbitrary datum.

Q. What do the horizontal lines represent?

A. The discharge in second feet.

Q. I show you a curve on here entitled "1928 to September 30, 1931," and ask you what that curve represents?

A. That curve represents the average curve drawn through our discharge measurements, and which was used for the period 1928 to September 30, 1931, to determine the discharge.

Q. Would you mind illustrating for the purpose of the Court the manner of use of this rating curve, how you use it?

A. The curve is drawn to average all our discharge measurements. After we determine the curve, the figures are tabulated into a form of rating table, and the rating table is used to determine the discharge.

648 Q. In conjunction with the charts you have previously explained showing the variations in the elevation of the river, what use would you make of those charts and this rating curve to determine the stream flow?

A. The mean gauge height determined from the recorded charts is used to determine the discharge from this rating curve.

Q. From what elevation does this rating curve start, and to what elevation does it go?

A. This curve starts at the gauge heights of minus one foot and goes to an elevation of twenty feet.

Q. And show the rating curve between minus one foot and an elevation of twenty feet?

A. Yes, sir.

(Said chart, exhibit 52, offered in evidence.)

Q. I show you a chart entitled "Rating Curve for New River at Caperton, W. Va." And I ask you if that was prepared under your direction.

A. It was.

Q. Is that chart similar to the one you have just testified about at the Rating Curve to the Kanawha River and Kanawha Falls?

A. Yes, sir.

Q. Was this prepared in a similar manner?

A. In the same way; yes, sir.

Q. Does this purport to show the same facts for New River at Caperton, as shown for Kanawha River at Kanawha Falls, by the preceding chart?

A. Yes, sir.

(Said chart, exhibit 53, offered in evidence.)

Q. I show you a paper entitled "Rating Curve for New River near Hinton, W. Va." Was this prepared under your direction and supervision?

A. Yes, sir.

Q. Does it purport to show for New River near Hinton the same rating curve at for New River at Caperton, W. Va., as shown by the preceding chart?

649 A. Yes, sir.

Q. What section of New River is shown on this rating curve?

A. That is a section at Pack's Ferry.

Q. At Pack's Ferry?

A. Yes, sir.

Q. Would you spell it?

A. P-a-c-k-'-s.

Q. I don't know whether I ought to leave that as an exhibit or not, but I now do so, as the Government Exhibit No. 54.

(Exhibit 54 offered in evidence.)

Q. I show you two sheets of paper, marked for identification as the Government's Exhibit No. 55, entitled "Rating Table for the Kanawha River at Kanawha Falls, W. Va., from October 27, 1928, to September 30, 1931," and I ask you if these tables—if that table was prepared under your direction and supervision.

A. It was; yes, sir.

Q. And what does that table purport to show?

A. This table is a tabulated rating curve; it is a rating curve put in tabular form for convenience and use.

Q. Instead of looking at the rating curve to determine the discharge of the Kanawha River at Kanawha Falls, you would look at this rating table and get the same information?

A. Yes, sir.

Q. Is it any more accurate than the rating curve?

A. I would not say it is more accurate, but it is more convenient, because if we were to use the rating curve, it would soon wear out the curve, and this table can be made into group form and we get the same figures every time for the same gauge height, but in the curve you might get something slightly different.

Q. Did you use this rating table in your office?

A. Yes, sir.

Q. I show you two sheets marked "Plaintiff's Exhibit 56" entitled "Rating Table for New River at Caperton, W. Va., November 20, 1928, to September 30, 1930." Was that prepared under your direction or supervision?

650 A. Yes, sir.

Q. What does that purport to show?

A. This is the same as the previous table, showing the tabulated relation between the gauge height and discharge as taken from the Rating Curve.

Q. And it is similar to the one just presented for the Kanawha River at Kanawha Falls.

A. Yes, sir.

Q. Was this table used in your work as District Engineer on the Geological Survey.

A. Yes, sir.

Q. I offer this in evidence.

(Exhibit 56 offered in evidence.)

Q. I show you four sheets of paper, marked for identification as Government Exhibit No. 57, and entitled "Rating Table for New River near Hinton, W. Va., from October 1, 1929, to September 30, 1934, and from December 1, 1923, to ————, and from December 1, 1923, to September 30, 1929, and I will ask you if these were prepared under your direction and supervision.

A. I will have to modify that. The first sheet was not prepared by me—the first sheet was prepared in 1926 in the Washington office.

Q. Do you mean the first sheet or the last sheet?

A. This is the one that I call the first—it is the earliest in date. I might say that the fourth sheet was prepared in the Washington office, and the third sheet also was prepared in the Washington office, and the second sheet was prepared in the Washington office, and in 1930, I revised the rating curve and prepared a new one covered by the notes on those sheets—which merely uses parts of the other tables.

Q. From what data did you prepare this revision?

A. From the discharge measurements made during 1930, based on measurement 17 of the curve.

Q. Does this rating table apply to the rating curve presented as Government Exhibit No. 54 for the rating curve on New River at Pack's Ferry, W. Va.?

651 A. Yes, sir.

Q. And has this table been used by you in your official capacity?

A. Yes, sir.

(Exhibits 51, 55, and 57 offered in evidence.)

Cross-Examination by Mr. JACKSON:

Q. Mr. Kessler, were these discharge measurements made by current meter?

A. Yes; all discharge measurements were made by current meters.

Q. Is there a factor of error in a discharge measurement made on the current meter.

A. Yes, sir; there is, in the very best machinery there is some percentage of it.

Q. In that phase of it in the current meters.

A. Yes, sir; there is always bound to be some.

Q. Are you able to say about what percentage of error is in a single measurement—discharge measurement with the current meter.

A. It varies considerably.

Q. Within what range would you say it varies?

A. I would say they vary over five percent—if it was over five percent, we would discard the measurement.

Q. How would you know it was over 5%?

A. By using an average series of measurements.

Q. You mean that if you took a series of measurements and you found that some of these measurements varied over 5%, above or below the average that you would discard these measurements.

A. We might under certain conditions; in others we would not. It depends on the local conditions at that gauge station.

Q. There would have to be a range of 10% before you would discard the measurement.

A. Yes, sir.

Q. And you might use measurements which deviated from the average more than 5%.

652 A. Yes, sir; in several places.

Q. And you frequently do that.

A. Yes, sir.

Q. And when you make a rating curve, you simply plot on a sheet of paper the number of discharge measurements it records.

A. That is right; yes, sir.

Q. And then you draw, in accordance with your judgment, a smooth curve through these points.

A. Yes, sir; that is it.

Q. And some of these measurements may lie considerably to one side or the other in the smooth point.

A. Yes, sir.

Q. The smooth curve, rather.

A. Yes, sir.

Q. How often do you change your rating curve?

A. We don't change it, if the plot is on one side and then on the other. We call that checking the average curve. If we see they are consistently on one side, we would make a revision in the curve.

Q. Why would you make a revision—what would cause these measurements to vary consistently to one side?

A. Better apparatus developed in the last few years is the main cause.

Q. The cause is that you have detected an error in your old rating curve, isn't it?

A. There probably hasn't been enough measurements to define the average curve.

Q. It would take, as a matter of fact, a great many measurements to define a rating curve with prevision, wouldn't it?

A. It would on some stations, not all.

Q. And you ordinarily, on a rating-curve chart, don't have as many as fifty measurements, do you?

A. It depends on how many we have made—numbered, you see.

Q. You said that this rating curve, as I understood it, aimed to cover a range from one below datum to twenty above datum, at Kanawha——

653 A. At Kanawha Falls.

Q. Did your discharge measurements cover that entire range?

A. The last measurement is minus .65 and the highest one, I don't know that it appears on that sheet, but it is on my list, and it goes to 20½.

Q. Ordinarily the number of discharge measurements, at the intermediate stage or stages is greater than the number of measurements at low or high stages?

A. Yes, sir.

Q. And, therefore, the ordinary degree of accuracy of a rating chart curve is greater at intermediate stations than others.

A. I would think so.

Q. What is meant by control in stream measurements?

A. And control?

Q. Yes, sir.

A. Control could be defined as a riffle below the gauge and some obstruction which will regulate the flow of water.

Q. Does that ever particularly change?

A. This control changes frequently.

Q. Does that modify a rating curve?

A. Yes, sir.

Q. And then you have it corrected.

A. Yes, sir; we make frequent changes where the control what we call shifts.

Q. Would you say frequently—possibly as much as two or three times a year.

A. Usually floods will cause control to change, and we have made two or three changes a year on the rating curve.

Q. Is that likely to result from spring and fall floods on the average streams such as there is in this territory?

A. I would not say spring and fall; they might occur any time; there is no definite time for that in this part of the country.

654 Q. That is true. There is no definite time for floods.

You introduced here a number of exhibits of graphical representations of gauge heights, at Kanawha Falls and Caperton, W. Va.

A. Yes, sir.

Q. I understand that they were made by a continuously recording gauge at this particular location?

A. Yes, sir; they were.

Q. How long has there been a continuously recording gauge at Kanawha Falls?

A. I would have to refer to one of the publications to get the exact date, but I believe in the fall of 1928.

Q. Can you now recall how long there has been a continuously recording gauge at Caperton, W. Va.

A. If I remember, about the same period—November 1928.

Q. Are there other gauges operating at Kanawha Falls concurrently with the gauge, the records of which you have produced here?

A. Not a recording gauge.

Q. What gauges are there?

A. What they call the navigation gauge, used by the Weather Bureau at 1,000 feet up stream, called the staff gauge.

Q. Is there any other that you know of?

A. Not that I know of.

Q. Was there any gauge at Kanawha Falls before the installation of this continuously recording gauge in 1928?

A. I would like to refer to my records to get the exact figures on that.

Q. I am not asking you for figures.

A. There was a series of station gauges operated since 1877 and 1878.

Q. At Kanawha Falls?

A. In the Kanawha Falls vicinity.

Q. Is that true at Caperton?

655 A. No, sir; the first gauge was put in in 1928.

Q. And there was no gauge there before that of any kind.

A. No, sir.

Q. How were the records read at Kanawha Falls before 1928, if they were read or kept.

A. There were station gauges read probably once or twice a day.

Q. By whom?

A. By the local observer.

Q. Your department would employ some farmer residing in the neighborhood to read the gauge?

A. At Kanawha Falls, I think we had an official weather bureau observer.

Q. Are you sure of that?

A. Our publication gives the whole history.

Q. He was a farmer paid by the Weather Bureau, wasn't he?

A. I don't know whether he was a farmer or not. I doubt it.

Q. Were there any charts kept that you know of before 1928 at Kanawha Falls?

A. No recording instruments were there at all.

Q. No chart was prepared daily by hand and kept there.

A. None that I prepared.

Q. Or that you know anything about?

A. No, sir; I don't know anything about it.

Q. Do you know what was the relative accuracy of the records at Kanawha Falls—the gauge records before the installation of the continuously recording gauge in 1928 and afterwards.

A. No, sir; I never figured it.

Q. Am I right in understanding that these exhibits 56 and 57, described as rating tables, are simply read off of the smooth curve appearing on the charts received in evidence at rating curves?

A. Yes, sir; they are read off the smooth curve and smoothed out to get each smooth curve, before we can read it. We allow a one percent change at any point.

656 Q. You first select figures from points on the rating curve?

A. Yes, sir.

Q. And then you again adjust those and interpolate them?

A. Yes; adjust it slightly.

Q. And make a smoother curve?

A. Yes, sir.

Q. It is smoother than the one on the rating chart?

A. I would not say that; it is very smooth, but we cannot read it accurately, consequently they are asked to read within one percent.

Redirect examination by Mr. GATCHELL:

Q. The matter was called to your attention about Exhibit No. 52, being the rating curve for Kanawha River at Kanawha Falls, and you were asked if the rating curve shown on there for the period 1928 to September 30, 1931, has been varied since that curve was drawn on that chart.

A. Yes, sir; we have drawn a new rating curve since 1931, beginning October 1, 1931, based on subsequent discharge measurements; and that has been again revised, based on still later measurements.

Q. And can you approximate the percentage of correction of the original curve?

Q. Has it been modified on the exhibits?

A. The dates are shown here when each curve was used and new curves have been drawn on this exhibit.

Q. They have?

A. Yes, sir.

By Mr. GATCHELL:

Q. Can you approximate the percentage of correction shown on the chart, on the curve for 1928 to September 30, 1931?

A. You could not approximate it in percentage, because it varies from zero to a maximum and then it goes back to zero again.

Q. What is the maximum?

A. That is hard to determine offhand. That would have to
657 be worked out to find where the maximum is. It is about eight percent and a gauge height of 18 feet.

Q. It is about eight percent and a gauge height of 18 feet—that is about the percentage of correction shown on the chart, is it?

A. Yes, sir; at that point.

Q. Are these charts used in the work of the Geological Survey?

A. They are; yes, sir.

Q. Was it considered reliable?

A. Yes, sir; they were.

RECROSS-EXAMINATION

Q. Are they prepared in the regular course of the work of the Geological Survey?

A. Yes, sir; in the regular course of the work of the Geological Survey.

By the COURT:

Q. You are the resident engineer for the Geological Survey?

A. I am District Engineer in West Virginia.

DIRECT EXAMINATION

Q. Mr. Kessler, I show you a chart entitled "New River, Eggleston, Virginia, July 4 to July 21, 1936," and will ask you if you recognize that paper?

A. Yes, sir; this is the chart that I removed myself from the gauging station at Eggleston.

Q. I show you Govt. Exhibit 121, a blueprint, and will ask you if that is a blueprint of this original chart?

A. Yes, sir; it is.

Q. What does this chart purport to show?

A. This chart shows the elevation of water surface above the arbitrary datum at the gauging station at Eggleston, Virginia, for the period of July 4th to July 21, 1936.

Q. Was this chart obtained from a mechanical recording gauge?

A. Yes, sir; it was.

Q. Was it similar to the gauge height chart that you
658 testified to on your previous appearan... in this case?

A. It is the same type of recorder but made by another manufacturer.

Q. It is the same kind of recording gauge?

A. The same type of recording gauge.

By the COURT:

Q. Does that purport to show the elevation of the stream?

A. The elevation of the water surface above the arbitrary datum.

By Mr. GATCHELL. If Your Honor please, in order that we may return the originals, may I ask leave of the Court to introduce as Exhibit 121 the blueprint of this original chart?

By the COURT. Very well, you may do so.

By Mr. GATCHELL. I now desire to offer this blueprint in evidence.

(Said blueprint, exhibit 121, offered in evidence.)

Q. I show you chart entitled "New River, Hinton, West Virginia, July 6 to July 21, 1936," and will ask you if you recognize that chart?

A. Yes, sir; I removed that chart personally.

Q. From what place did you remove it?

A. From the gauging station on New River near Hinton, W. Va.

Q. Is this station the station commonly known as Pack's Ferry?

A. Yes, sir; it is.

Q. And was this chart made by the mechanical recording gauge?

A. Yes, sir.

Q. What does it purport to show?

A. This shows the elevation of the water surface above the arbitrary datum.

Q. At Hinton, West Virginia, during July 6 to 21st, 1936?

A. That is right.

Q. I show you Government Exhibit 122, a blueprint, and will ask you if that is a correct blueprint copy of this chart?

A. Yes, sir; it is.

659 Q. What is the time interval between Eggleston, Virginia, and Hinton, West Virginia, in the flow of the water?

A. I do not know.

(Exhibit 122 offered in evidence.)

Cross-examination by Mr. JACKSON:

Q. Referring to Plaintiff's Exhibit 121, can you tell me what the scale is?

A. Is that the Eggleston record?

Q. Yes.

A. The gauge height scale is 2 inches to the foot.

Q. There is no scale shown on this exhibit, is there?

A. I did not put the scale on, but there is enough evidence to show the scale is there and what the scale is, and what the datum is.

Q. Can you tell us what zero is or what line shows zero or represents zero on the chart, Exhibit 121?

A. The base line is one foot, and the top line is six feet.

Q. The base line is one, at the bottom of the chart?

A. Yes, sir.

By the COURT:

Q. The paper that you hold in your hand was taken from the recording instrument itself?

A. Yes, sir; from the recording instrument.

Q. If there was a rise in the river of about 6 or 8 feet, would that instrument record it?

A. Yes, sir; when the pencil reaches the top marginal line it automatically reverses and goes in the other direction for the higher stages of the river.

By Mr. JACKSON:

Q. Do these gauge heights on Exhibit 121 refer to the most recently published rating for that station?

A. I don't know.

Q. Do you know what the mean annual stream flow is?

A. No; I do not.

Q. Eggleston, Virginia, is not in your District, is it?

660 A. No, sir; it is not.

Q. I assume that it is customary for District Engineers in the U. S. Geological Survey to work back and forth from one District to the other?

A. Yes, we frequently change places like that if we are in that vicinity.

Q. You worked back and forth with Mr. Dirzulaitis in these matters?

A. Yes; we have done so. I might visit his district and he might visit mine, to inspect them. Of course, we could remove his record on request, or inspect it, on request, and he could inspect our record or remove it on request.

Q. Mr. Derzulaitis has the Virginia District which includes Eggleston?

A. Yes, sir.

Q. Who requested you to remove this chart?

A. Mr. Derzulaitis.

By the COURT:

Q. For my information only, when you want to determine the stream flow, the exact flow of the stream, does that come directly from the gauge or is it the result of a calculation after measuring the stream height?

A. First we have to make the current meter measurements with the current meter and get the rating of the stream and then when we know the gauge height we can determine the corresponding discharge.

By Mr. GATCHELL:

Q. I wonder if I might go a little further and see if we can get a clearer picture of that, and that is, what particular rating table, what part does that play in the calculation of the discharge?

A. The rating curve or rating table is used to determine the discharge at any instant during any hour or day.

By the COURT:

Q. Is there any formula worked out for that particular method, and then you apply that formula to the gauge reading?

661 A. I would not call it a formula, it is just the relation between the gauge height and discharge, just the figures.

By Mr. GATCHELL:

Q. That figure is obtained by measuring the stream flow with your measurement meter, and putting the mark on the graph, from which you later draw the smooth curve.

A. That is right.

By Mr. JACKSON:

Q. Is that a matter of precision or approximation?

A. It is not precision because there is a certain amount of error in any determination in the field, it is not an exact science.

Q. What you finally get is a number of measurements that will be plotted here and there on the graph when you apply them?

A. Yes, sir.

Q. And then in the exercise of your best judgment, you have to draw a smooth curve through those plotted points, which you will then take as your rating curve?

A. Yes, sir; that is right.

Q. And from that, you will work up or construct the so-called rating table?

A. That is right.

Q. And the fewer measurements the more likelihood of greater error in drawing your curves. Isn't that true?

A. That depends on the station and local conditions.

Q. If you had a large number of stream measurements platted on your curve, you would be more likely to be able to draw an accurate curve, than if you had only a few measurements platted?

A. Yes, sir; that is understood.

Q. And the relative accuracy of that sort of estimate varies between gauging stations?

A. Yes, sir; it does.

By the COURT:

Q. You spoke of it not as a formula but a relation which must be worked out and established for a particular point on a stream?

662 A. Yes, sir.

By Mr. JACKSON:

Q. And that relation varies from time to time?

A. Yes, sir; that will vary.

Q. And that is why you have got to keep constructing new rating curves as they get too far away from reasonable accuracy?

A. That is why we have to do continuous stream gauging.

Q. And of course, you may or may not gauge the changes as soon as they occur?

A. No, sir.

Q. Now I want to ask you about Exhibit 122. What is the scale of that exhibit?

A. That is the same scale as Eggleston, one to six, we call it, two inches to the foot.

Q. And the base line is one?

A. The base line is zero and the top line is five.

Q. And that is true of Exhibit 121, or not?

A. No, sir; there are no two alike.

Q. Which one is zero?

A. This one is zero on the base line.

By Mr. GATCHELL:

Q. Is this the customary method of making stream gauge measurements?

A. What do you mean?

Q. Is this the usual method of making stream-flow measurements?

A. I don't know what you want yet. They are made with the current meter.

Q. Is this the customary method of obtaining the depth of water on the stream?

A. This is the method used and that we use, the recording instrument, and we also use staff gauges, or chain gauges, or various kind of gauges.

By Mr. JACKSON:

Q. I hand you, Mr. Kessler, what purports to be a photostat of a chart of the automatic gauge at Kanawha Falls for the period of from July 6, to July 13, 1936, which I think you
663 offered to supply to us before, and will ask you whether you can identify that photostat as a photostat of the original chart?

A. Yes; that is a photostat of the original chart.

Q. And the original photostat is where; in your office?

A. I don't know where it is right now. It might be in my office or it might be in Washington.

Q. I suppose you have examined the original chart and you can identify this as a photostat of the original chart?

A. Yes, sir.

By Mr. JACKSON. I would like to have this chart just identified by the witness covering the gauge at Kanawha Falls for July 6 to July 13, inclusive, 1936, marked "Defendant's Exhibit 507" for identification.

Q. Did you put the scale on the chart marked "Exhibit 507" for identification?

A. It is a printed figure, it might be mine, and it might be most any engineer's.

Q. You do not have any recollection about that?

A. Several engineers use the same style of printing and you cannot identify them.

Q. Can you tell whether it was done by your office?

A. No, sir; I cannot tell where that was put on.

Q. Can you state whether the scale as shown on there is correct? Please examine it and say.

A. Yes; the scale is correct.

Q. And according to that scale, where is your zero mark?

A. Two inches from the bottom.

Q. And the scale then is what, two inches?

A. Yes; two inches to the foot.

664 J. J. DIRZULAITIS

Direct examination by Mr. GATCHELL:

Q. Please state your present occupation.

A. I am District Engineer in the Geological Survey and Chief Engineer for the State Conservation and Development Commission. I am also Chief Engineer for the State Conservation Commission of Virginia.

Q. What territory do you cover as District Engineer of the Geological Survey?

A. The State of Virginia.

Q. Does that include New River in the State of Virginia?

A. Yes, sir.

Q. I show you a sheet of paper, marked for identification Exhibit No. 58, entitled "Water Records at Glen Lyn for the week ending Saturday, March 15, 1930," and I ask if that was prepared under your direction and supervision?

A. It was.

Q. Is this chart similar to a chart which Mr. Kessler presented?

A. It is determined in the same manner by the same record.

Q. For what date?

A. The week ending March 15, 1930, and the data is from March 8 to March 15.

By Mr. GATCHELL. May we enter the same stipulation with respect to this, Your Honor, that we purport to show nothing by this except the rating in the station gauges. No stream-flow figures are attempted to be shown by these charts, or these particular charts presented by Mr. Dirzulaitis. I offered this chart in evidence.

Q. I show you a sheet entitled "Water Records at Glen Lyn, Va., for the week ending Saturday, March 22, 1930," and ask you if that was prepared under your direction?

665 A. It was.

Q. And what does that purport to show?

A. It shows the flow—it shows the stages at Glen Lyn.

Q. For what period?

A. For the period from March 15 to March 22.

Q. 1930?

A. Yes, sir.

Q. I offer that in evidence as Exhibit No. 60 for the Government, which sheet is entitled "Water Records at Glen Lyn for the week ending Saturday, March 29, 1930." Is that continuous with the preceding chart?

A. Yes, sir.

Q. I show you another sheet entitled "Water Record at Glen Lyn for the week ending Tuesday, April 1, 1930." Is that a continuation of the preceding chart?

A. Yes, sir.

(Said chart, exhibit 61, offered in evidence.)

Q. Is there any time interval between the lines on that chart?

A. The time interval is 24 hours.

Q. And between each vertical line—between each two vertical lines, what time interval is it?

A. Two hours.

Q. I show you a chart marked as Exhibit No. 62 for the Government, New River at Eggleston, Va., March 11 to March 31, 1930, and ask you if that was a similar chart prepared under your supervision.

A. Yes, sir.

Q. And that is for New River at Eggleston, Va.

A. Yes, sir.

Q. I offer that in evidence at Exhibit No. 62.

666 Q. I show you Exhibit marked Exhibit No. 63 for the Government, entitled "New River at dam site 'A' at Radford, for the period from March 15, 1930, to April 1, 1930," and ask if that was prepared under your direction and supervision.

A. Yes, sir.

Q. Is that a similar chart for this dam site?

A. Yes, sir.

Q. Where is dam site "A" on New River?

A. It is just a little distance above Radford; I don't know the exact distance above the town there.

Q. Is it upstream from the Mouth of Little River?

A. Yes, sir; it is upstream from the mouth of Little River.

(Said chart, exhibit 63, offered in evidence.)

Q. I show you what has been marked as Exhibit No. 64 for identification for the Government entitled "New River and Allisonia, March 11 to April 1, 1930," and ask you if this is a similar chart for Allisonia.

A. Yes, sir.

Q. Was this prepared under your direction and supervision?

A. Yes, sir.

Q. The next is Exhibit No. 65, so marked for identification for the Government. I show you this chart entitled "New River to Ivanhoe, for the period from March 11 to April 1, 1930," and ask you if this is a similar chart prepared under your direction and supervision.

A. Yes, sir.

(Exhibit 65 offered in evidence.)

Q. I show you Exhibit No. 66, consisting of five pages, rating curves for New River to Glen Lyn, at Eggleston, at dam site "A" near Radford, Va., at Allisonia, Va., and at Ivanhoe, Va., and ask you if these rating curves were prepared under your direction.

A. Yes, sir.

667 Q. Are these similar rating curves to those explained by Mr. Kessler?

A. Yes, sir; they are.

Q. And were they prepared in accordance with instructions from the Geological Survey?

A. They were; yes, sir.

Q. Are they an approximately correct graph of the rating curves for the several stations shown?

A. Yes, sir; they are.

(Exhibit 66 offered in evidence.)

Q. Is the period of each chart shown on the face of the chart?

A. Each chart; yes, sir; each curve is dated for the period of use.

By Mr. GATCHELL:

Q. The next exhibit is marked for identification for the Government as No. 67. I show you Exhibit No. 67 consisting of five sheets, entitled "Rating Table of New River at Glen Lyn, Va., from August 10, 1927; at Eggleston, Va., October 1, 1920, to September 30, 1931; at Dam site 'A' near Radford, Va., without date; at Allisonia, Va., from September 26, 1929, and at Ivanhoe from December 15, 1929," and I ask you if these rating tables were prepared under your supervision.

A. Yes, sir; they were.

Q. Do these rating tables show in statistical form or put in statistical form the rating curve just submitted?

A. Yes, sir.

(Exhibit 67 offered in evidence.)

Cross-examination by Mr. JACKSON:

Q. You have introduced in evidence here certain *guage* records as exhibits 58 to 65 inclusive. Are there any corrections on those?

A. I don't know unless I examine them.

668 Q. I thought perhaps you might give me that from your recollection.

A. No, sir; I cannot.

Q. Will you be good enough to look at Exhibit No. 60 and state whether or not any corrections have been made?

A. Just what do you mean—to the graph or what—there are no corrections to the graph of this exhibit.

Q. Has there been any adjustment made in the interpretation of that graph or not?

A. There is a correction of minus .04, supposed to be subtracted from each guage height.

Q. Did you do that?

A. We don't subtract on here each guage height. I didn't check that. This chart was based on the discharge indicator, but to determine the daily discharge, we do not. This machine is set up to take care of that .04 correction.

Q. Who determines the correction that should be made?

A. One of the office force under my direction.

Q. And you don't know how or why he reached that conclusion?

A. Yes, sir.

Q. Why was that?

A. It was one of his own ideas, I suppose. It does not show on the chart.

Q. Do you want to revise your answer? You don't know why he made the correction personally, do you?

A. No, sir; because he left no trace of it here. There is no trace here of why he made the .04 correction.

669 Q. Is the same situation true with reference to the correction at the bottom of Exhibit No. 58? I don't know whether my question is clear. I am inquiring whether or not you know the reason for the correction made on the bottom of that exhibit. Did you shake your head?

A. No, sir; I didn't answer it yet. (Witness examines papers.) Oh, yes; I think what is shown here or interpreted here—he took this off a station guage and read 501 and the graph is interpreted to be read about 500—504 or 503—they possibly used it at 504, which makes minus three in the correction. That is where that correction came from, and I suppose that he interpreted that to mean the same as this chart, and his station reading of 344—the pencil stops at 348, and that makes the .04 correction. That is where he got the correction.

Q. How did he know that the station guage should have read differently?

A. He didn't know. The office man did not know; he accepted this station guage reading put on by the observer and he interpreted that and he took the chart where the angle line ended and he interpreted that reading on the chart, which he subtracted from the reading of the station guage and gave that correction.

Q. It was a matter of interpretation and judgment by some one in the office?

A. Yes, sir.

Q. Look at Exhibit No. 61 and No. 59 and state whether or not they also show corrections and interpretations.

A. Exhibit 59 shows correction of minus .04.

Q. And Exhibit 61, does it show a correction?

A. 61 shows a minus .04 correction.

670 By Mr. JACKSON:

Q. Now, I show you Exhibit No. 63, consisting of four sheets and being the record at dam site, I think you said, and I ask you whether or not that correctly—whether or not I correctly interpreted these four charts here as showing a correction of plus .04.

A. That is right.

Q. Each of your exhibits cover a period beginning about the middle of March 1930. Was there anything unusual about the flow of the river during the periods covered by these charts?

A. There was supposed to be an experiment that was supposed to have been operated in cooperation with the United States Army Engineers in Huntington, W. Va., and the Appalachian Electric Power Company.

Q. And the Geological Survey.

A. Yes, sir; of the water resources of Virginia.

Q. At whose instance was this experiment conducted?

A. Well, I just don't know exactly who it was, but I was in touch with representatives of both the Appalachian Electric Power Co., and Army Engineers in Huntington, W. Va.

Q. Can you state briefly how this experiment affected the stream flow. What was the nature——

A. No; I cannot, because we was only operating the *guages* and not watching the river. However, as I say, I think the representatives of either the Army or the Appalachian Electric Power Co. was operating the gates that sent down the flows, and we set the recorders for that period and left them and come back at the end of the period and checked back on the recorders.

671 By Mr. JACKSON:

Q. To refresh your recollection, do you know whether at this time water was being impounded and released in the Buck and Byllesby Reservoirs?

A. No; I don't, but if I may go on, the understanding was that the purpose of the experiment was to impound water and see its effect.

Q. Impound and release it?

A. Yes; because when we went into it we knew what we were going to try to determine and that is why the instruments and

everything were set for that purpose and investigated to see that the experiment would show what happened along the different points in the river.

Q. You said you knew what you were going to try to determine. What was it you were going to try to determine?

A. The wave action of this water.

By Mr. JACKSON:

Q. As the court has said, as I understood when he started, the very purpose of these tests in setting up these instruments was to determine the fluctuation or change in the flow resulting from the impounding of water and its release in the river above. Isn't that what you said?

A. Yes, sir.

By Mr. JACKSON:

Q. When you said affected the wave, you meant the wave produced by the impounding and releasing of large quantities of water at these dams?

A. That is right.

Q. That wave, as I understand, is what is sometimes called a tide that comes down the river with the fluctuation of the larger amount of water in the stream. Am I defining it right?

A. I don't know. I wouldn't attempt——

Q. How long has there been a gauge at Radford or at the dam site?

672 A. I don't know except for that period of record and also for a period back in 1928.

Q. Well, isn't it a fact that the gauge at the dam site, the record of which you have introduced here, was installed solely for the purpose of use during this experiment you have described?

A. This and the previous experiment.

Q. What earlier experiment was that?

A. 1928.

Q. Did you have anything to do with that?

A. Yes.

Q. Who made that?

A. The Water Resources of Virginia and the Army Engineers.

Q. And had it been there continuously since 1928—the gauge?

A. No, sir.

Q. It had been removed?

A. It had been removed.

Q. And was replaced solely for the purpose of this experiment that you have mentioned?

A. That is right.

Q. And at whose instance was it replaced?
A. I don't know just exactly. They say it was a cooperative study, as I call it, between the three agencies.

By the COURT:

Q. Those three being the United States Government, State of Virginia, and the defendant here?
A. That is right, Army Engineers of Huntington.

By Mr. JACKSON:

Q. As a matter of fact, didn't you have that gauge installed at the direct request of the representative of the defendant, the Appalachian Power Company, speaking of the gauge at Radford or the dam site?
A. Well, I don't know. I know the machine belonged to us. Who we were paid by to put the gauge there, I don't know.
Q. You stated this was in cooperation with three agencies, one the United States Army Engineers. Who represented the United States Army Engineers in that experiment, if you know?
A. I don't remember who was District Engineer at that time in Huntington.
Q. Was it the District Engineer at Huntington?
A. That is right.
Q. Whoever was in that office at that time?
A. That is right.
Q. Was that Col. Ardery?
A. Right. I think it was.

Redirect examination by Mr. GATCHELL:

Q. Mr. Derzulaitis, did you have any other records of the streamflow or changes in the stage of New River in 1930?
A. Yes; we have a continuous record during 1930 at Ivanhoe, Eggleston, Allisonia, and Glen Lyn.
Q. And is this part of those records?
A. This is part of those records.
Q. Is that the customary manner of keeping the records?
A. Just what do you mean?
Q. Do you ordinarily prepare your records in the manner which you have presented them here?
A. They are just exactly—no difference.
Q. Are those reports submitted to the Geological Survey?
A. They are published in the Annual Water Supply Papers.
Q. They are published in the Annual Water Supply Papers of the Geological Survey?
A. That is right.

674 Recross-Examination by Mr. JACKSON:

Q. Did you, in connection with your part in this experiment, prepare any charts or hydrographs other than those which you have offered here in evidence?

A. Yes; we converted some of the gauge heights over into discharge.

Q. That is you or someone under your direction converted these gauge heights at Ivanhoe?

A. Well, for our own information we converted them, I think, at most of the stations all the way down the river, but we didn't draw no conclusions.

Q. Will you produce copies of those hydrographs?

A. I will give you what I have got here.

By Mr. JACKSON:

Q. As I understand it, from the data which were recorded on these charts of gauge readings that you offered in evidence your office prepared a further paper known as a hydrograph which converted those gauge heights into streamflow at the various gauging stations?

A. We did.

Q. And you did that at each of the gauging stations about which you have given testimony here?

A. I think so. I wouldn't say whether we got them for all of them. We may have been interested in some of them.

Q. I show you here this blueprint entitled "Discharge Hydrograph Wave Study of New River at Ivanhoe, Virginia," prepared by F. F. Schrader and T. F. Hanly, engineers, United States Geological Survey, University of Virginia, in cooperation with the United States Army Engineers and Appalachian Electric Power Company, and ask you whether that is a copy of one of the hydrographs which was prepared under your direction?

675 A. Yes.

(Said blueprint, exhibit 500, marked for identification.)

Mr. JACKSON. I produce a blueprint entitled "Discharge Hydrograph Wave Study of New River, Allisonia, Virginia, prepared by F. F. Schrader and T. F. Hanly, Engineers, United States Geological Survey, University of Virginia, in cooperation with the United States Army Engineers and Appalachian Electric Power Company." and ask to have it marked for identification, Defendant's Exhibit No. 501.

By Mr. JACKSON:

Q. I show you Defendant's Exhibit No. 501 for identification and ask you whether that is one of the hydrographs which you have testified were prepared in your office under your direction?

A. It is.

Mr. JACKSON. I produce another blueprint entitled "Discharge Hydrograph Wave Study, New River, at dam site near Radford, Virginia, prepared by F. F. Schrader and T. F. Hanly, Engineers, United States Geological Survey, University of Virginia, in cooperation with the United States Army Engineers and Appalachian Electric Power Company" and ask to have it marked "Defendant's Exhibit No. 502" for identification.

I produce a further blue print entitled "Discharge Hydrograph Wave Study of New River at Eggleston, Virginia, March 11–31, 1930, prepared by F. F. Schrader and T. F. Hanly, Engineers, United States Geological Survey, University of Virginia, in cooperation with the United States Army Engineers and Appalachian Electric Power Company" and ask to have it marked "Defendant's Exhibit No. 503" for identification, and I produce one further blue print entitled "Discharge Hydrograph Wave Study of New River at Glen Lyn, Virginia, March 12 to 31st, 1930, prepared by T. F. Hanly and F. F. Schrader, Engineers, United States Geological Survey, University of Virginia, in cooperation with the United States Army Engineers and Appalachian Electric Power Company" and ask to have it marked "Defendant's Exhibit No. 504" for identification.

By Mr. JACKSON:

Q. Mr. Derzulaitis, I now show you Defendant's Exhibits 502, 503, and 504, all marked for identification, and ask you to state whether each of these exhibits was prepared under your direction in connection with the experiment which you have described?

By Mr. JACKSON:

Q. These exhibits for identification (hydrographs) are based, as I understand it, upon the gauge records and rating curves which you have offered in evidence here.

A. They are.

676 CHARLES H. PIERCE

Direct examination by Mr. THOMPSON:

Q. Will you please state your name to the stenographer?

A. Charles H. Pierce.

Q. Where do you reside, Mr. Pierce?

A. 1900 Jackson Street NE., Washington, D. C.

Q. What is your position?

A. Hydraulic engineer, United States Geological Survey.

Q. How long have you been with the United States Geological Survey?

A. I was first appointed in 1910.

Q. And have you been continuously with the Survey since then?

A. No, I was out for a period of about five and one-half years from November 1925 to May 1931.

Q. Will you please state your training, education, and experience as an engineer?

A. I am a graduate of the University of Vermont with a degree of Bachelor of Science in Civil Engineering, and also have a degree of Associate in Arts, Harvard College, Master of Arts, Harvard University. For about a year, 1904 and '05, I was engaged in railroad work with the Boston & Albany Railroad and the Lake Shore Division of the New York Central Lines.

Q. Was that engineering work?

A. It was. For the college year 1906 and '07 I was teaching Theoretical and Applied Mechanics at the University of Illinois. Four years, 1906 to 1910, I was Assistant Professor of Civil Engineering and Mathematics, University of Vermont. In September 1910 I received an appointment as Junior Engineer in the Water Resources Branch of the United States Geological Survey.

Q. What positions have you held with the United States Geological Survey?

A. The position of Junior Engineer, Assistant Engineer, Engineer, Hydraulic Engineer, and District Engineer, and am now Hydraulic Engineer, Senior Grade.

677 Q. Did you ever do any particular work in the New England District?

A. I was District Engineer in charge of the New England office of the Geological Survey from May 1915 to November 1925.

Q. What did you do after that?

A. I resigned from the Geological Survey and was employed with Charles T. Main, Inc., Consulting Engineers, Boston.

Q. And what kind of work as Consulting Engineer did you do?

A. The work was varied, largely in connection with design and construction of hydroelectric plants and various hydraulic studies in connection with design and operation of power plants, cost estimates, valuations of water rights, and things of that kind.

Q. When did you return to the Geological Survey?

A. May 1, 1931.

Q. What societies are you a member of?

A. The engineering societies of which I am a member—American Society of Civil Engineers, Section of Hydrology, American Geophysical Union.

Q. What are your duties with the Geological Survey as Hydraulic Engineer, Senior Grade?

A. My duties are varied, as I am on the staff of the Chief Hydraulic Engineer and subject to various assignments. I have a great many research problems. At the present time I am in charge of the work being done at the National Hydraulic Laboratory.

Q. Have you ever seen New River, Mr. Pierce?

A. I have at various times.

Q. What part of New River have you seen?

A. I have seen New River from Galax gauging station and all of the gauging stations on New River and the Kanawha River to its mouth.

Q. How recently have you seen New River?

A. I saw most of New River—I saw New River below Galax and that part of the Kanawha River about Kanawha Falls during the week of July 10, 1936.

678 Q. I believe you said you had seen some of these gauging stations. Please state the gauging stations you have seen.

A. I have seen the station at Galax, the station at Ivanhoe, at Allisonia, at Eggleston, Glen Lyn in Virginia, and Hinton, Caperton on the New River, and the station at the Kanawha Falls on the Kanawha River; also the station on Little River at Graysonton and the old Radford station at Radford.

Q. What is the type of gauge being used at these gauging stations?

A. The gauges at the stations now in operation are continuous water-stage recorders which operate automatically with a continuous record of gauge height.

Q. Can you tell when these automatic gauging stations were placed at the different stations on these two rivers?

A. I can tell by reference to my notes.

Q. Please have reference to your notes. The one at Galax—when was that installed with an automatic gauge?

A. That station was established in November 1929, with an automatic gauge at that time.

Q. Where is the gauge with relation to the town of Galax?

A. It is about three and one-half miles, approximately, southwest of Galax.

Q. The station at Ivanhoe—when was that installed?

A. In December 1929, with an automatic gauge that has been used since that time.

Q. And where is that located with respect to Ivanhoe?

A. That is within what is called the boundaries of Ivanhoe. It is practically in the town limits. We estimate that as being two and one-half miles above the mouth of Cripple Creek.

Q. When was the Allisonia gauging station established, the automatic one?

A. In September 1929.

Q. And how near is it to Allisonia?

A. Well, that is about half a mile above Allisonia.

679 Q. What about the station at Eggleston?

A. That station is at the highway bridge at Eggleston, and the automatic gauge was installed July 1, 1926. Previous to that time, from October 1st, 1914, to June 30, 1926, the chain gauge on the downstream side of the bridge was read morning and evening to hundredths.

Q. What do you mean by "to hundredths"?

A. Hundredths of a foot.

Q. What about the station at Glen Lyn, Virginia?

A. That is a water-stage recorder which is approximately one-fourth mile southeast of Glen Lyn and one-third mile above the mouth of East River; an automatic gauge installed in August 1927.

Q. You say southeast of Glen Lyn. Does that mean it is upstream from Glen Lyn?

680 A. My recollection of that is downstream. I won't be positive.

Q. When was the gauging station or the automatic gauge at Hinton, West Virginia, established?

A. The staff gauge was read twice a day at that place from December 1923 to November 1934, after which time the automatic gauge has been in operation.

By Mr. JACKSON:

Q. Since 1934?

A. Since November 1934.

By Mr. THOMPSON:

Q. About the one at Caperton, West Virginia?

A. That is an automatic gauge just downstream from the suspension bridge in the gorge and the automatic gauge which is used there was installed in November 1928.

By Mr. THOMPSON:

Q. When was the automatic gauge at Kanawha Falls established?

A. That was established in October 1928.

Q. Prior to that what did they use at Kanawha Falls?

A. From March 28, 1877, to September 30, 1916, the records were obtained at Staff gauge, about 1¾ miles below the mouth of Gauley River. The records, Lock 2, Montgomery, have been published by the Geological Survey for certain periods, especially for the period January 1, 1888, to September 30, 1918. These records were obtained at Staff Gauge on right bank a short dis-

tance above the upper gauge of the Lock and records have been published by the Geological Survey for the period from October 1, 1918, to September 30, 1929, which were obtained by the use of a gauge pipe. The record at the so-called weather bureau gauge, which is about 1,800 feet upstream from the site of the water gauge in use now.

Q. Was that a United States weather gauge that you speak of?

A. My understanding is that the gauge was established by army engineers, but I wouldn't be positive of that.

681 Q. You say it was established by army engineers?

A. That is my understanding, but I wouldn't be positive about that.

Q. Do you know when the gauge at Graysonton, Virginia, was established?

By Mr. JACKSON:

I did not get where you said the staff gauge at Hinton from 1922 to 1934 was located.

A. The staff gauge near Hinton is at the site of Packs Ferry, and the water-stage recorder is in the same location, only a little bit back from the river.

By Mr. THOMPSON:

Q. Now answer the question I asked you.

A. From October 1928 to November 1931 there was a chain gauge at the highway bridge, which was read twice a day, hundredth of a foot. The automatic gauge has been in use since November 1931, and is located about 900 feet below the highway bridge at Graysonton, about seven miles above the mouth of the river.

Q. Now please state about the old one at Radford, that you referred to?

A. A gauging station was maintained by the Geological Survey at the highway bridge near the railroad station at Radford from August 1, 1898, to July 15, 1906, and from May 6, 1907, to September 30, 1915, when the station was discontinued by the Geological Survey.

Q. Have you made a study of the drainage area of New River?

A. Yes; I have.

Q. What is the drainage area at the Radford dam site?

A. The drainage area at the Radford dam site is 2,382 square miles, from our recent measurements, from the latest topographical maps. These measurements being made in June 1936.

Q. Do you know what the drainage area is at Eggleston, or at the Eggleston Gauge?

682 A. Our measurements made in June 1936, were from the latest maps and show a drainage area of 2,941 square miles at the Eggleston gauge.

Q. What is the drainage area at the Radford gauge?

A. From similar measurements made from the latest maps in June 1936, we found the drainage area at the Radford gauge to be 2,736 square miles.

Q. What is it at the Allisonia gauge?

A. From similar measurements made in June 1936, we found the drainage area at the Allisonia gauge to be 2,202 square miles.

Q. Have you made any investigation of the drainage area of Little River?

A. I have.

Q. What did you find that to be?

A. We found the drainage area of Little River at the mouth to be 335 square miles.

Our measurement at a point where a gauging station was maintained, at the Graysonton station, we found the drainage area to be 298 square miles.

At the old Copper Valley gauging station we found the drainage area to be 238 square miles.

Q. When did you make your last measurement of the last drainage area of Little River?

A. Those measurements were made in June 1936.

Q. And what did you find, at the mouth of Little River, the drainage area to be?

A. 335 square miles.

Q. Do you know what the drainage area of Kanawha River at Kanawha Falls is?

A. We find the drainage area of Kanawha River at Kanawha Falls to be 8,367 square miles, from the measurements we made in February and March 1935.

683 Q. Have your recent measurements in any way changed the past measurements of the drainage areas in this district?

A. There have been some changes in the figures.

Q. Have they been great or slight?

A. In most cases they have been very slight.

Q. Now you spoke of the recent ones, when did you make those?

A. The recent measurements for those were made in February and March 1935, and in June 1936.

Q. Do you know what the maximum recorded discharge in cubic feet, per second, was at Kanawha Falls?

A. The maximum recorded discharge was about 270,000 feet per second, on September 14, 1878.

Q. 1878 or 1877, which was that?

A. 1878.

Q. Where did you get those figures from?

A. I got those figures from Water Supply Papers that have been published, 536, page 62, and elsewhere.

Q. What are those water supply papers?

A. Those are reports of stream gauges; publication of data by the Geological Survey.

Q. Are they in public circulation?

A. They are available for those who want them.

Q. Under whose authority are they printed?

A. By authority of the Secretary of the Interior.

Q. What is the minimum discharge recorded for Kanawha Falls, and when did it occur?

A. The minimum that has been recorded was 640 cubic feet per second, on August 15, 1930.

Q. Where did you get that figure from?

A. Water Supply Paper 758, page 111, also other Water Supply Papers carry the same information.

Q. Can you give the lowest flow of record at Kanawha Falls for the years 1925 and 1930?

684 A. In 1930 it was 640 cubic feet per second, on August 15th. In 1925 we did not have a continuous record, but there were three days, August 12, September 12th, and October 3rd, when the flow was 1,020 cubic feet per second, from observations made at about 7 o'clock in the morning.

Q. Where do we find those figures?

A. Those will be found in the Water Supply Paper published for that year.

Q. Was that 758?

A. 603. I beg your pardon—I made a mistake; that is 728.

Q. Is it not 758?

A. No; 728.

Q. Page 111, is it not?

By Mr. JACKSON:

Isn't that 728?

A. It may be down wrong in my notes, but I had it 728.

By Mr. THOMPSON:

Q. I hand you Surface Water Supply in the United States for 1934. Please examine it.

A. This one gives the minimum which has been observed, which was on August 15, 1930, 640, page 111, Surface Water Supply, 34, No. 3, Ohio River Basin.

By Mr. JACKSON. Is it numbered?

By Mr. THOMPSON. The number is 758.

By the COURT:

Q. You refer to 758. What is that reference? Is that the number of the publication?

By Mr. THOMPSON: It is the number of the paper, the Geological Survey Paper.

By the WITNESS. If you will refer to Water Supply Paper 728, page 100.

685 By Mr. JACKSON:

Q. One minute; that is the record for 1925 that you are talking about now?

A. Pages 100 and 101.

Q. Can you give me the date of that?

A. On page 101 it gives October 3rd.

Q. You mean for the year 1925?

A. That date is in 1925. Our reports are on the water year beginning in October and running until September the following year, so under the caption of 1925–1926, October 3rd refers to the year 1925, and for that day the flow was 1,020.

By Mr. THOMPSON:

Q. Then, your date for the 640 cubic feet was, as I understand it, August 15, 1930?

A. Yes, sir.

Q. What is the average annual maximum flow at Kanawha Falls?

A. The figures which I had is published for the highest daily flow. I do not have the peak flow for all years, but the average for the annual maximum daily flows for the 58 calendar years, 1878 to 1935, is 117,684.

Q. Cubic feet per second, you mean?

A. Yes, sir.

Q. What is the average annual minimum flow at Kanawha Falls?

A. The average of the lowest days' flow for each year for the 58 calendar years, 1878 to 1935, is 2,047 cubic feet per second.

Q. And how did you arrive at that?

A. By taking for each calendar year the mean flow for the lowest day and averaging it.

Q. And what period of years did you cover there?

A. 58 calendar years, 1878 to 1935.

Q. What is the average lowest flow for a day at the Radford dam site during the calendar year 1925 and the calendar year 1930?

686 A. Those are necessarily computed on those at the places where gauging stations are located, and from those computations I find that for the calendar year 1925 the lowest

average flow for any one day at the Radford dam site was 539 second feet, or cubic feet per second, on September 29, 1925, computed from records at the Eggleston Gauge.

For the calendar year 1930, the lowest average flow for any one day was 521 second-feet, on September 6, as computed from records at the Allisonia and Eggleston Gauges and records of Little River, at Graysonton.

Q. What is the lowest average flow of record at the Kanawha Falls gauge?

A. 1,130 second-feet for the month of October 1930.

Q. And what was the average flow of New River at the Radford Dam site for the month of October 1930?

A. The average flow of New River at the Radford Dam site for the month of October 1930 was 759 second-feet as computed from records at the Allisonia and Eggleston gages and records of Little River at Graysonton.

Q. What was the lowest month of lowest mean flow of Kanawha River at Kanawha Falls in the year 1925, Mr. Pierce?

A. The lowest average flow was September 1925, and the average flow for the month at Kanawha Falls was 1,340 second-feet.

Q. What was the average flow at the Radford Dam site for the month of September 1925?

A. Average flow at the Radford Dam site for the month of September 1925 was 671 second-feet as computed from the Eggleston gauge.

Q. What was the maximum flow of New River at the Radford Dam site during the years 1878 and 1916?

A. The flow was approximately 155,000 cubic feet per second on September 15, 1878, and approximately 146,000 cubic feet per second on July 16, 1916. These figures are approximate,
687 but I believe are as good as can be obtained.

Q. Have you computed the average flow of New River at the Radford Dam site over a period of years?

A. The average for 28 years ending September 30, 1935, was 3,211 cubic feet per second as computed from records obtained at the Radford, Allisonia, and Eggleston gages on New River, and records at the Copper Valley and Graysonton gages on Little River.

Q. What percentage of time is the flow at the Radford Dam site less than 9,000 cubic feet per second?

A. About 96.8 percent of the time.

Q. What percentage of time is the average flow at the Radford Dam site less than 3,211 cubic feet per second?

A. About 65% of the time.

Q. What is the lowest average flow on record for Little River at its mouth?

A. We have no recorded flow at the mouth of Little River, but the lowest flow of record at the Graysonton gage of 298 square miles was 50 cubic feet per second on September 21, 1932. I do not know exactly what the flow was at the mouth, but if it increased in proportion as the drainage area increased, it would have been about 56 second-feet.

By Mr. JACKSON. Average for what period of time?

By Mr. THOMPSON:

For one day, wasn't it?

A. Lowest average flow for period of record is what I understood.

By Mr. JACKSON:

Is that an instantaneous flow or daily flow?

A. One day.

Q. What is the mean flow from Little River at its mouth?

A. About 401 cubic feet per second, as computed from our duration of flow curves.

688 Q. For what period?

A. Covering a 28-year period, ending September 30, 1935.

Q. Have you ever determined the maximum flow of Little River?

A. I have not.

Q. State whether the natural flow of Little River has ever been as low as 25 second-feet?

A. We have no recorded flow as low as 25 second-feet.

Q. Do you know what percentage of time the flow above Little River is below 77 second-feet?

A. About 99.5 percent of the time.

Q. And what percentage of the time is it, the average weekly flow, in excess of 221 second-feet?*

A. The average weekly flow of Little River at the mouth, as computed from records obtained at the gauging stations at Copper Valley and Graysonton for the periods Sept. 28, 1908, to Sept. 30, 1916, and Oct. 29, 1928, to Sept. 28, 1935, a total of 779 weeks, exceeded 221 second-feet for 75.3 percent of the time.

Q. Can you state what percent of time the water that passes Kanawha Falls gauge during the month, or did pass during the month of October 1930, came from above Little River, Mr. Pierce?

A. About 64.7 percent.

Q. Please state the amount of water flowing past Kanawha Falls gauge for the lowest low-water month for 1925 that came from above the Radford project?

*Correction on page 494.

A. That lowest month was September 1925, when about 50.1 percent of the water passing Kanawha Falls came from above the mouth of Little River.

Q. Where have you gotten these figures from?

A. These figures were obtained from, or the basic information used, has been obtained from records published in the Water Supply papers in the U. S. Geological Survey and unpublished records for 1935.

689 By the COURT. You are figuring it for the month and not for the lowest day?

By the WITNESS. As I understood the question it was for the month, the lowest low-water month.

By the COURT. What was the flow in Kanawha Falls?

By the WITNESS. Kanawha Falls, 1,340, and in New River, above the mouth of Little River, was 671 as computed.

Q. And that was the percentage of 50.1?

A. Yes, sir.

Q. I hand you Plaintiff's Exhibits marked for identification Nos. 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, and 83, and ask you what they are?

A. These are what are commonly called Water Supply papers, the title being "Surface Water Supply of the United States, the Ohio River Basin."

Q. Are you familiar with those water-supply papers?

A. I am.

Q. Who are they published by?

Q. I believe you testified you got the papers, or rather got the figures or basic data you have given here upon which you have testified, from the Water Supply papers of the Geological Survey; is that correct?

A. Yes, sir; and some unpublished records for 1935.

Q. Are the documents which you hold in your lap, and which have been identified, marked for identification; are those the volumes from which you got the basic data from which you have testified today?

A. Yes, sir; the same things.

By Mr. THOMPSON. If the Court please, we offer these in evidence.

By the COURT. Are they statistical data published under the auspices of the U. S. Geological Survey each year?

690 By the WITNESS. Yes, sir.

By Mr. JACKSON. We have no objection as long as they do not include any reports, nor do we concede of course the correctness of some of the figures.

(NOTE.—Exhibits marked for the Government "Nos. 68 to 83," inclusive, filed.)

Q. I hand you documents marked for identification Exhibits Nos. 84, 85, 86, and 87, for the Government, and ask you if you know what they are?

A. These are the unpublished records for the year ending September 30, 1935, giving daily and monthly discharge for four gaging stations.

Q. What is Exhibit #84, for what station does that give the figures?

A. The figures for station on New River at Ivanhoe, Va., for the year ending September 30, 1935.

Q. And Exhibit #85, what is that?

A. That is for station on New River at Allisonia, Va., for the year ending September 30, 1935.

Q. And Exhibit #86, what is that?

A. For the station on New River at Eggleston, Va., for the year ending September 30, 1935.

Q. And Exhibit #87, state what that covers?

A. For Little River at Graysontown, Va., for the year ending September 30, 1935.

(Exhibits 84, 85, 86, and 87 offered in evidence.)

Q. What will become of these advance sheets you have filed here as Exhibits #84 to 87, inclusive?

A. Those will appear in published form, in similar forms to those, in a few months.

By the COURT:

Q. They will become a part of a volume like those?

A. Yes, sir.

Q. Have you made any computations of the flow of the Kanawha River at the point of its confluence with the Ohio River?

A. Yes; I have computed the flow of Kanawha River at its mouth, at various low-water periods.

Q. Can you state the average flow of Kanawha River at its mouth for the ten-day period, July 10 to July 19, 1918?

691 A. My computations for that period show an average flow of 5,035 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 9-day period, July 23 to July 31, 1918?

A. My computations for that period show an average flow of 7,365 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 8-day period, August 24 to August 31, 1918?

By Mr. JACKSON. I should like to enter an objection to the relevancy of this testimony. It seems too remote to go into it in this case.

By the COURT. I can't say it is too remote.

By Mr. JACKSON. May we have our objection in the record, showing it is overruled and exception noted, and let it be understood it is to apply to this line of testimony?

By the COURT. Yes.

A. My computations for the period from August 24 to August 31, 1918, eight-day period, show an average flow of 4,735 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the eight-day period, September 21 to September 28, 1920?

A. My computations for that period show an average flow of 3,950 second-feet.

Q. What was the average flow of the Kanawha River at its mouth for the five-day period, October 8 to October 12, 1920?

A. My computations for that period show an average flow of 4,035 second-feet.

Q. What was the average flow of the Kanawha River at its mouth for 13-day period, October 15 to October 27, 1920?

A. My computations for that period show an average flow of 2,710 second-feet.

Q. What was the average flow of the Kanawha River at its mouth for the three-day period, September 19 to September 21, 1923?

A. My computations for that period show an average flow of 2,365 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the three-day period, September 30 to October 2, 1923?

A. My computations for that period show an average flow of 3,690 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 4-day period, October 8 to October 11, 1923?

A. My computations for that period show an average flow of 1,895 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 12-day period, October 14 to October 25, 1923?

A. My computations for that period show an average flow of 1,655 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the six-day period, August 24 to August 29, 1925?

A. My computations for that period show an average flow of 1,430 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the seven-day period, September 4 to September 10, 1925?

A. My computations for that period show an average flow of 1,265 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the four-day period, September 13 to September 16, 1925?

A. My computations for that period show an average flow of 1,170 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the eight-day period, August 16 to August 23, 1929?

A. My computations for that period show an average flow of 3,750 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 17-day period, August 16 to September 11, 1929?

A. My computations for that period show an average flow of 4,020 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the seven-day period, September 24 to September 30, 1929?

A. My computations for that period show an average flow of 2,820 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 31-day period of August 1 to August 31, 1930?

A. The average flow from my computations for that period shows 1,580 feet, second-feet.

693 Q. What was the average flow of Kanawha River at its mouth for the thirty-day period, September 1 to September 30, 1930?

A. My computations for that period show an average flow of 1,330 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the thirty-one-day period, October 1 to October 31, 1930?

A. My computations for that period show an average flow of 1,150 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 27-day period, November 1 to November 27, 1930?

A. My computations for that period show an average flow of 1,785 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 119-day period, August 1 to September 27, 1930?

By Mr. THOMPSON:

That is an error. That should be to November 27, 1930.

A. My computations for that period show an average flow of 1,460 second-feet.

By Mr. JACKSON:

Was your computation actually for the period Mr. Thompson asked you?

By Mr. THOMPSON:

That was my mistake.

A. This computation is for the 119-day period, August 1 to November 27, 1930.

Q. What was the average flow of Kanawha River at its mouth for the 20-day period, October 25 to November 13, 1931?

A. My computations for that period show an average flow of 2,445 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 9-day period, August 9 to August 17, 1932?

A. My computations for that period show an average flow of 3,935 second-feet.

694 Q. What was the average flow of Kanawha River at its mouth for the 37-day period, August 25 to September 30, 1932?

A. My computations for that period show an average flow of 1,580 second-feet.

Q. What was the average flow of Kanawha River at its mouth for the 12-day period, October 10 to October 21, 1933?

A. My computations for that period show an average flow of 1,760 second-feet.

By Mr. BAKER. I have read this letter and I regret to find it seems to create in my mind the same impression it did on your Honor. I would like to know if my friends on the other side have any desire to help us get these witnesses. We think they would be valuable to help the Court. If they do not, we will have to take whatever steps we are advised to meet the effect of this letter.

By Mr. THOMPSON. I have had no knowledge of the effect of this letter. I don't know what would be done, so far as the authorities in Washington would be concerned. I am under the Attorney General and would be controlled by what he might say.

By the COURT. You saw the substance of the letter, that the Secretary of War doesn't seem to feel like making available a witness for an adverse party. I take that to be his position as expressed there.

By Mr. BAKER. He says there are enough witnesses to the facts without bringing them, and he isn't willing to have them come as experts, and I feel sure if my Brothers on the other side share my view, these are probably the best qualified people to help the Court.

By Mr. THOMPSON. I would like to read this over tonight.

Direct Examination by Mr. THOMPSON:

Q. I ask you now, Mr. Pierce, this same question corrected: What was the average flow of the Kanawha River at its mouth for the seventeen-day period from August 26th to September 11th, 1929?

A. My computations for that period show an average flow of 4,020 second-feet.

Q. Mr. Pierce, from your study of the records of the flow of the Kanawha River at its mouth, can you break down your figures into averages for shorter periods?

A. I can.

Q. What was the average flow of the Kanawha River at its mouth for the four-day period from August 1st to August 4th, 1930?

A. For that period my computations show an average flow of 1,385 second-feet.

Q. What was the average flow of the Kanawha River at its mouth for the eight-day period from August 13th to August 20th, 1930?

A. For that period my computations show an average flow of 1,370 second-feet.

Q. What was the average flow of the Kanawha River at its mouth for the seven-day period from September 15th to September 21st, 1930?

A. For that period my computations show an average flow of 1,430 second-feet.

Q. What was the average flow of the Kanawha River at its mouth for the ten-day period, September 26th to October 5th, 1930?

695 A. For that period my computations show an average flow of 1,290 second-feet.

Q. What was the average flow of the Kanawha River at its mouth for the period September 13th to September 22nd, 1932, a ten-day period?

A. For that period my computations show an average flow of 1,250 second-feet.

Q. What was the average flow of the Kanawha River at its mouth for the five-day period from September 4th to September 8th, 1925?

A. For that period, September 4th to September 8th, 1925, my computations show an average flow of 1,280 second-feet.

Q. Why did you take a five-day period there?

A. The five-day period was taken for use in comparison with flows of the Ohio River. That particular five-day period was taken for use in comparison with the flow of the Ohio River.

Q. Mr. Pierce, have you computed the flow of New River at the Radford dam site for any low-water periods?

A. Yes; I have.

Q. What was the average flow of New River at the Radford dam site for the ten-day period July 5th to July 14th, 1918?

A. My computations for that period show an average flow of 1,760 second-feet.

Q. The flow of 1,760 second-feet at Radford dam site was what percentage of the total flow of the Kanawha River at its mouth for the period July 10th to July 19th, 1918?

A. About 35 percent.

Q. In these comparisons of flow of New River at the Radford dam site and Kanawha River at its mouth, what time interval have you allowed?

A. I have allowed a time interval of five days.

Q. Why have you allowed that five days?

A. Because from hydrographic comparisons of flows it appeared that a five-day time interval was required for the flow to pass from the Radford dam site to the mouth of the Kanawha River.

696 Q. What was the average flow of New River at the Radford dam site for the eight-day period from July 18th to July 26th, 1918, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations for that period show that the flow of New River at the Radford dam site was 2,140 second-feet, which was 29 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the eight-day period from August 19th to August 26th, 1918, and what percentage was that flow of the flow of the Kanawha River at its mouth five days later?

A. My computations for that period show that the flow of New River at the Radford dam site was 2,260 second-feet, which was about 48 percent of the flow of the Kanawha River at its mouth during the period five days later.

By Mr. THOMPSON:

Q. What was the average flow of New River at the Radford dam site for the eight-day period from September 16th to September 23rd, 1920, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the flow of the New River at the Radford dam site for that period was 1,840 second-feet, which was 46 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the five-day period from October 3rd to October 7th, 1920, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the flow of New River at the Radford dam site for that period was 1,600 second-feet, which was about 40 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the thirteen-day period from October 10th to
697 October 22nd, 1920, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the flow of New River at the Radford dam site for that period was 1,360 second-feet, which was about 50 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the three-day period, September 14th to September 16th, 1923, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the flow of New River at the Radford dam site for that period was 1,155 second-feet, which was about 49 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of the New River at the Radford dam site for the three-day period, September 25th to September 27th, 1923, and what was the percentage of that flow to the flow of the Kanawha at its mouth five days later?

A. My computations show that the flow of the New River at Radford dam site for that period was 1,500 second-feet, which was about 41 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of the New River at Radford dam site for the four-day period, October 3rd to October 6th, 1923, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the flow of the New River at the Radford dam site for that period was 1,070 second-feet, which was about 56 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of the New River at the Radford dam site for the twelve-day period, October 9th to October 20th, 1923, and what was the percentage of that flow to the flow
698 of the Kanawha River at its mouth five days later?

A. My computations show that the flow of New River at the Radford dam site for that period was 1,030 second-feet, which was about 62 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the six-day period from August 19th to August 24th, 1925, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the flow of New River at the Radford dam site for that period was 674 second-feet which was about 47 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the seven-day period, August 30th to September 5th, 1925, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the flow of New River at the Radford dam site for that period was 597 second-feet, which was about 47 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the four-day period from September 8th to September 11th, 1925, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the flow of New River at the Radford dam site for that period was 616 second-feet, which was about 53 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the eight-day period from August 11th to August 18th, 1929, and what percentage was that flow of the flow of the Kanawha at its mouth five days later?

699 A. My computations for that period show the average flow of New River at the Radford dam site was 1,930 second-feet which was 51 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the seventeen-day period from August 21st to September 6th, 1929, and what percentage was that flow of the flow of the Kanawha River at its mouth five days later?

A. My computations for that period show that the average flow of New River at the Radford dam site was 1,680 second-feet, which was about 42 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the seven-day period from September 19th to Sep-

tember 25th, 1929, and what percentage was that flow of the flow of the Kanawha at its mouth five days later?

A. My computations for that period show that the average flow of New River at the Radford dam site was 1,680 second-feet which was about 59 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of the New River at the Radford dam site for the thirty-one-day period from July 27th to August 26th, 1930?

A. My computations for that period show an average flow of the New River at the Radford dam site of 980 second-feet.

Q. What was the average flow of New River at the Radford dam site for the thirty-day-period from August 27th to September 25th, 1930?

A. My computations for that period show an average flow of 847 second-feet.

Q. What was the average flow of New River at the Radford dam site for the thirty-one-day period from September 26th to October 26th, 1930?

A. My computations for that period show an average flow of 779 second-feet.

700 Q. What was the average flow of New River at the Radford dam site for the twenty-seven-day period from October 27th to November 22nd, 1930?

A. My computations for that period show an average flow of 1,095 second-feet.

Q. What was the average flow of New River at the Radford dam site for the 119-day period, July 27th to November 22nd, 1930?

A. My computations show that the average flow for that 119-day period was about 921 second-feet.

Q. What percentage of the total flow of the Kanawha River at its mouth during the 119-day period from August 1st to November 27th, 1930, came from above the Radford dam site?

A. About 64 percent.

Q. What was the average flow of New River at the Radford dam site for the twenty-day period from October 20th to November 8th, 1931, and what percentage was that flow of the flow of the Kanawha at its mouth five days later?

A. My computations for that period show that the flow of New River at the Radford dam site was 931 second-feet which was 38 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. The answer which you have given was for the flow at its mouth?

A. My computations for that period show that the flow of New River at the Radford dam site was 931 second-feet which was 38 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the nine-day period, August 4th to August 12th, 1932, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations for that period show that the average flow at the Radford dam site was 1,290 second-feet which was about 33 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Rad-
701 ford dam site for the thirty-seven-day period from August 20th to September 25th, 1932, and what was the percentage of that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations for that period show that the average flow at the Radford dam site was 810 second-feet which was about 51 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of the New River at the Radford dam site for the twelve-day period from October 5th to October 16th, 1933, and what was the percentage of that flow to the flow of the Kanawha at its mouth five days later?

A. My computations for that period show that the average flow at the Radford dam site was 883 second-feet which was about 50 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the four-day period, July 27th to July 30th, 1930, and what percentage was that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations show that the average flow of New River at the Radford dam site for that period was 822 second-feet which was about 60 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the eight-day period from August 8th to August 15th, 1930, and what percentage was that flow to the flow of the Kanawha at its mouth five days later?

A. My computations show that the average flow of New River at the Radford dam site for that period was 810 second-feet which was about 59 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the seven-day period from September 10th
702 to September 16th, 1930, and what percentage was that flow to the flow of the Kanawha River at its mouth five days later?

A. My computations for that period show that the flow of New River at the Radford dam site was 827 second-feet, which was 58 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the ten-day period, September 21st to September 30th, 1930, and what percentage was that flow to the flow of the Kanawha at its mouth five days later?

A. My computations for that period show that the average flow of New River at the Radford dam site was 908 second-feet, which was 70 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the ten-day period, September 8th to September 17th, 1932, and what percentage was that flow to the flow of the Kanawha at its mouth five days later?

A. My computations for that period show that the average flow of New River at the Radford dam site was 766 second-feet which was 61 percent of the flow of the Kanawha River at its mouth during the period five days later.

Q. What was the average flow of New River at the Radford dam site for the five days period, August 30th to September 3rd, 1925, and what percentage was that flow to the flow of the Kanawha at its mouth five days later?

A. My computations for that period show that the average flow of New River at the Radford dam site was 584 second-feet, which was about 46 percent of the average flow of Kanawha River at its mouth during the period five days later.

Q. Have you figured out all the periods of low flow at Radford and Kanawha, Mr. Pierce?

A. We have not used all of the periods of low flow.

703 Q. Are there many others?

A. There are quite a few; many others.

By the COURT: What is the latest time as to which the witness was questioned, when was that, do all the periods precede the Marmet-London Dam?

By Mr. THOMPSON. Yes, sir.

By the COURT. When was the Marmet-London Dam completed?

By Mr. THOMPSON. 1935.

Cross-examination by Mr. JACKSON:

Q. Mr. Pierce, counsel just stated that among the periods for which you have given evidence relative to the flow of New River at the Dam site, there are included some periods of mean flow. Will you state any period of mean flow at the Dam site which is covered by any figures you have given in your testimony?

A. I do not understand the question.

Q. In your testimony have you given figures for any period of mean flow at the Dam site?

A. These figures are figures for average flow for a period of several days.

Q. Yes; but is any one of the periods which you have selected, or someone has selected, and which have been covered in your testimony, a period of mean flow at the Dam site?

A. Oh, you mean mean flow, average for a long time flow?

Q. Yes.

A. I think that these periods are all for flows considerably below the average flow at the Dam site for a long time period.

Q. That is what I was trying to get at. Mr. Pierce, you have in your testimony given a good many figures from Water Supply papers and calculations based upon figures appearing in those papers, have you not?

A. Yes, sir.

Q. You do not personally vouch for the accuracy of the figures appearing in these publications and which you have used as a basis for your testimony, do you?

A. I did not personally make those original computations, which were published in Water Supply Papers, if that is what you mean.

Q. I merely want to bring out the facts, and isn't it true that you didn't make the measurements, or make the records or computations, and you have personally no means of knowing or vouching for the accuracy of those figures?

704 A. I believe I can safely say that I do have means of knowing that the figures published in the Water Supply papers are accurate, so far as they can possibly be made accurate, although I did not make them myself, they were made by my associates, and by my predecessors, covering a period quite a few years back, and followed the same methods which I used.

Q. All I am trying to bring out is that you yourself are not seeking to testify personally as to those figures?

A. Only that they are the published figures as the basis of my testimony is all.

Q. And those are published estimates of flow, are they not, Mr. Pierce?

A. They are.

Q. Counsel asked you whether you had not seen the New River from time to time, and I think you said you had?

A. Yes, sir.

Q. Is there any computation or calculation to which you have testified here which was affected by your observation of New River?

A. No.

Q. Would it be fair to say that your testimony could have been, if it was not, as well prepared in your office in Washington, without going to the New River, as though you did view it?

A. Possibly, although I felt that a personal knowledge of the subject would be helpful in the work.

Q. Did you modify any of your figures because of anything you saw at New River?

A. No.

Q. I think you gave some figures about drainage areas and said that the latest measurements had been made in February and March of 1935, and June 1936; is that correct?

A. Yes, sir.

Q. Now am I right in understanding that these measurements or new measurements are simply calculations made from maps?

A. These drainage-area measurements are measurements
705 of areas on topographic maps.

Q. And these new measurements in 1935 and 1936 are, as I understand it, merely the latest calculations that have been made from maps for these areas, about which you have testified; is that true?

A. They are the latest ones which we have made, and on these latest measurements we used later maps, which were not available at the time the original measurements, a number of years ago, were made.

Q. Of course I don't mean to be facetious, but there was no change in the drainage areas between the time of these calculations and the ones previously made?

A. By reason of using better maps?

Q. I don't believe you quite get my question. [NOTE.—Question read.]

A. Of course there were no changes in the physical configurations on the ground which would actually determine the drainage areas of the rivers.

Q. And all of the differences arose from recalculations on maps?

A. Yes, sir.

Q. Now, I think you said that none of your calculations disclosed any significant change; is that true?

A. There were no very large changes, a few square miles.

Q. You testified, I believe, that the drainage of Little River at Copper Valley is 238 square miles; is that correct?

A. Yes, sir.

Q. As a matter of fact, isn't it a fact that the drainage area at Little River at Copper Valley is computed by the U. S. Geological Survey and reported in Water Supply paper #536, page 41, 195 square miles?

A. I believe that is the figure which was used at that time.

Q. It was one of these published figures, was it not?

A. Yes, sir.

Q. And you have a difference of 22% in your calculations of that drainage area, approximately?

A. Something like that.

706 Q. That is a pretty substantial change, I would think, in this kind of work, is it not?

A. That expressed in terms of percentage makes quite a large figure.

Q. Well now I am only trying to get this as a matter of information, Mr. Pierce. I understood your testimony to be that the drainage area at Radford Bridge is presently estimated at 2,736 square miles; is that right?

A. My figure for the drainage area is 2,736 square miles.

Q. It further appears from the Water Supply paper 536 that the drainage area at Radford Bridge is there given as 2,720 square miles, or a difference of only 16 square miles; is that right?

A. I believe that was the figure which had been used prior to these more careful measurements which have just been made.

Q. Is this Little River area included in the Radford Bridge measurement?

A. Yes, sir.

Q. And do you know the explanation of how the drainage area of Little River increased 43 square miles while the drainage area of Radford bridge was increased only 16 square miles?

A. I could only answer that question definitely by referring to the computation books on which were recorded the results of the measurements made by the men who made those measurements at an earlier time.

Q. You mean the map measurements?

A. Yes, sir.

Q. You did not make those map measurements yourself?

A. These later ones, 1935 and 1936, were all made under my immediate supervision; the earlier measurements I did not make and had nothing to do with their making.

Q. Am I right in understanding from your testimony that there is a considerable degree of inaccuracy in these earlier measurements or earlier published figures in these Water Supply papers?

A. Are you referring to these drainage-area figures?

Q. I am at the moment; yes.

707 A. If you are referring to the drainage-area figures, the earlier ones were made at a time when the area was not as fully mapped as it is today, and that is probably one explanation of the differences in the figures which had been used from those which we have now obtained from more careful measurements on the latest maps.

Q. Mr. Pierce, you testified yesterday that the maximum recorded discharge at Kanawha Falls was 270,000 second-feet on September 14, 1878. How was that recorded?

A. The height of water was recorded by an observer who read the gage. The discharge corresponding to that height of water was computed from the rating curve or rating table, prepared by the engineers.

Q. Well, am I right in understanding that a rating curve is made by drawing a smooth curve through discharge measurements?

A. So far as the discharge measurements go, but peaks are hardly ever covered by discharge measurements.

Q. Now the fact is, isn't it, there was no rating curve for 270,000 second-feet, or anything approaching it?

A. There was a rating curve.

Q. It was a theoretical curve, based upon no measurements, was it not?

A. It was extended from the highest measurements which had been made, and was governed in its position to a large extent by results of the other measurements at lower stages.

Q. Is it fair to say it is an estimate of the flow?

A. Oh, of course we can only say it is an estimate, because we did not actually measure that height.

Q. Then you had no other measurements from which to judge the amount of the flow at anywhere near such a high stage, had you?

A. There were other high measurements, of course not as high as that. I do not know where. I do not have that information here as to what the next highest measurement or what the highest measurement was.

Q. Did you have any for half as high?

708 A. Well, I could not say definitely whether it was half or three-quarters. I do not have that curve, or the list of measurements here.

Q. Well, half would be 135,000 second-feet. Can't you say from your own recollection you had no measurement as high as that?

A. I do not remember the figures.

Q. You testified, I believe, that the minimum recorded discharge of Kanawha Falls was 640 second-feet on August 15, 1930; is that right?

A. I do not remember all of those figures. I would have to look it up.

Q. You have it in your memorandum from which you testified here?

A. I have it here, if you will allow me to look it up.

Q. All right. (Witness referred to notes before answering.)

A. That is correct, as published in Water Supply paper 758, page 111.

Q. What was the average, or mean discharge, on August 15, 1930?

A. I think I will have to look that up in the Water Supply paper.

Q. Will you look at Water Supply paper #698, page 67, and tell me if it isn't 1,070 second-feet.

A. The average flow for that day, which was August 15, 1930, was 1,070 second-feet.

By the COURT. Mr. Pierce, do hydraulic engineers use the terms "mean" and "average" as being synonymous, or what distinction is there between the use of the terms?

By the WITNESS:

There is no distinction in their use; they are both used synonymously to mean the same thing.

Q. What was the maximum discharge on August 15, 1930?

A. I do not know.

Q. Was it not substantially greater than 1,070 second-feet?

A. Yes, sir.

Q. Was this recorded measurement or estimate of 640 second-feet an instantaneous flow?

A. Yes, sir.

709 Q. How long did the flow at Kanawha Falls remain at 640 second-feet on August 15, 1930?

A. I could not tell you without having reference to the recording gage chart for that day.

Q. Will you produce that chart, please?

A. I do not have it here, unless it is filed among other exhibits.

Q. If you do not have it here, if it is not included among other exhibits, will you supply it?

A. It can be obtained from Washington.

Q. I will ask you to supply that as soon as it can be obtained, in the event you haven't it here now.

By Mr. THOMPSON:

Do you have it in the office in Washington?

By the WITNESS:

I am not positive whether that is in the Washington office or whether that is in the District office. We did have it in Washington.

Q. Where is the District Office?

A. The District Office is Mr. Kessler's office at South Charleston.

Q. The witness who testified yesterday?

A. Yes; I am not sure if that particular chart may be in his office or in Washington.

Q. You will get it one place or the other?

A. I can get it. It will probably take a few days to get it.

Q. I should like to have you produce at the same time the records that will show the flow for two or three days on either side of August 15, 1930; will you do that?

A. Yes, sir.

Q. So far as you know, this supposed instantaneous flow of 640 second-feet may have lasted only a minute?

A. I saw the record, and made use of the record, and my recollection is that it was a rather short period of time, which might have been perhaps only a few minutes at the minimum, but approaching that and going from that I think it would have taken, of course, more time.

710 Q. Well, if the average flow was 1,070 second-feet, would it not necessarily follow that any minimum flow of 640 second-feet, if it occurred, would be of relative short duration?

A. It would appear so.

By the COURT:

Why would that be, supposing there had been a sudden storm, local storm, in that part of the country, which would run the flow of the river up considerably say from late afternoon to midnight to raise your average to 1,070, why couldn't it have remained at 640 during most of the forenoon?

By the WITNESS:

Under those circumstances it might have. As I remember that particular record, however, I do not recall that it did have the appearance of a very high stage.

By the COURT:

I understood you to say that, but Mr. Jackson asked the question if it didn't necessarily follow the average of 1,070 feet for the day indicated the minimum existed for only a very short time—I am just trying to get some information.

By the WITNESS:

I think my answer was not strictly correct, that under the circumstances as you have mentioned that it might have remained at that very low stage for a considerable period of time during the day.

By the COURT:

Although your recollection of the chart, as you visualize it, is to the contrary?

By the WITNESS:

Yes, sir.

Q. Mr. Pierce, when you investigated this question, did you ascertain whether there was any sudden storm or any kind of storm? I mean on August 15, 1930.

A. I do not recall any particular investigation as to storms on that day.

711 Q. I show you page 67 of Water Supply paper #698 and direct your attention to the period from the 11th to the 20th of August 1930, and ask whether you can't tell the Court from an inspection of that table that there was no storm or storm run-off, storm water run-off, at that point during that period?

A. That is a period of low flow, with no indication of there having been any large storm, although on the 16th of August the discharge, average discharge, for the day was 1,450, indicating on that day, August 16, there was a rise, which I do not know how high it went.

Q. Is that a relatively high or low flow?

A. That is a relatively low flow.

By Mr. JACKSON:

Q. Mr. Pierce, there was a reported minimum flow or estimated minimum flow in this same water supply paper for the year ending, as I understood you, September 30, 1930, at Caperton, W. Va.

A. Yes; the minimum recorded discharge at Caperton, West Virginia, for that year was 826 second-feet on September 10th, 1930.

Q. That would be the lowest flow at Caperton any time during the year ending September 30, 1930?

A. Yes, sir.

Q. And it would, I assume, necessarily follow that the flow at Caperton on August 14th must have been larger, by some amount, than 826 second-feet?

A. Yes, sir.

Q. Where is the Caperton gauge with reference to the gauge at Kanawha Falls?

A. It is upstream.

Q. About how far?

A. I could not give you the distance in miles.

Q. Would you think that perhaps 20 miles is about right?

A. I should think it might be in that vicinity.

By Mr. McWHORTER:

It is 19 miles.

By Mr. JACKSON:

You say say it is 19 miles, Mr. McWhorter?

712 A. Yes, sir.

Q. Mr. McWhorter says it is 19 miles. We will accept that if you will agree to it, Mr. Pierce.

A. That is as near as I can give it.

Q. Is that a steep gradient from Caperton to Kanawha Falls?

A. I don't know what the gradient is.

Q. What is the drainage area at Caperton gauge, estimated by the United States Geological Survey?

A. My measurements show that the drainage area of New River at Caperton is 6,826 square miles.

Q. And what is the drainage area at Kanawha Falls. Your estimate yesterday, I believe, was 8,367 square miles?

A. Yes, sir.

Q. And is that approximately 22% greater than the drainage area at Caperton?

A. I can compute that if you wish me to.

Q. If you are willing to take that as a rough estimate it is all right, but if you prefer to compute it, and it will only take a minute, go ahead.

A. Which is the base in that case—Caperton?

Q. Yes; Caperton.

A. It is about 22 percent.

Q. Mr. Pierce, what was the estimated average daily flow at Caperton for August 15, 1930?

A. The average daily flow for August 15, 1930, at Caperton was 1,190 second-feet.

Q. 1,190 second-feet?

A. Yes, sir.

Q. I think you have already testified that the average daily flow at Kanawha Falls, according to the estimates in the U. S. G. Records of August 15, 1930, was 1,070 second-feet. Is that right?

A. I do not recall having given an estimate for that date?

Q. I will ask you to look it up in the Water Supply paper, but I think you told me that was right, 1,070 second-feet?

713 A. Yes; that is right.

Q. Mr. Pierce, what was the minimum estimated flow at the Glen Lyn automatic gauge for the water year ending September 30, 1930?

A. The minimum discharge at Glen Lyn for that year was 770 second-feet on September 8, 1930.

Q. That, of course, means that the flow on any other day at Glen Lyn was higher than that minimum during the year ending September 30th, 1930?

A. Yes, sir.

Q. That is, the minimum flow?

A. Yes, sir.

Q. What is the drainage area as estimated by you at Glen Lyn?

A. I did not remeasure the area at Glen Lyn. The only figures I have is what has been published in the Water Supply Paper.

Q. And that is what?

A. 3,770 square miles.

Q. Do you accept that figure as approximate?

A. Yes.

Q. You have already stated that the drainage area at Kanawha Falls is 8,367 square miles. Is that true?

A. Yes, sir.

Q. And the percentage of the drainage area at Kanawha Falls would be substantially more than twice as great as the drainage area at Glen Lyn?

A. Yes.

Q. Mr. Pierce, at page 1476 of the record, you testified to a flow of 1,020 cubic feet per second at Kanawha Falls, on August 12, 1930. Should that have been August 30th?

A. I do not get the question exactly, or what the question was before, or what my answer was.

Q. You are reported as testifying to a flow of 1,020 cubic feet per second at Kanawha Falls on August 12, 1930. We do not check that and I wonder if that was an error and it should be August 30th?

A. I believe that I said that in 1925 there were three days——

714 Q. I meant to say 1925. I merely want to know if you meant to testify to August 12th or August 30th as the date of this alleged flow?

A. If I could see Water Supply Paper 698, I could answer your question. No; that is wrong, it should be 758.

(Water Supply Paper No. 758 is here handed to the witness.)

A. May I see Water Supply Paper No. 728?

(Water Supply Paper No. 728 is handed to witness.)

Q. Did you ascertain whether there was any error in the transcript of your testimony in regard to the flow on August 12, 1925, at Kanawha Falls?

A. The answer should have read that in 1925 there were three days, August 30th, September 12th, and October 3rd, when the flow was 1,020 cubic feet per second.

Q. We thought that was correct?

A. Yes, sir.

Q. Were those instantaneous flows?

A. Those were computed from gauge heights obtained at about seven o'clock in the morning.

Q. You did not quite answer my question. Were they instantaneous flows as computed by you?

A. It was computed from one reading, but I do not know how long that flow continued.

Q. The reading only represents the instantaneous flow?

A. Yes.

Q. Mr. Pierce, when you produce the chart for Kanawha Falls for August 15, 1930, and a few days each way, please also produce the chart of the automatic gauges at Caperton and Glen Lyn, which would be comparable with the periods covered by the chart for the gauge at Kanawha Falls?

A. Very well.

Q. On yesterday, Mr. Pierce, you gave an estimate of flow above the mouth of Kanawha River for a ten-day period extending from July 10th to July 19th, 1918. Do you have the figure for the corresponding average flow at Kanawha Falls?

A. From the period of July 10th to July 19th, 1918?

715 Q. Yes. I am asking you what was your estimated average flow at Kanawha Falls for the period which, in your opinion, corresponded with the flow from July 10, 1918, to July 19, 1918, at the mouth of the Kanawha?

A. I will have to get that from the Water Supply Paper No. 536.

(Water Supply Paper No. 536 is handed to the witness, who examines same.)

A. In Water Supply Paper 536 at Page 111, for July 9th to July 18th, I have given the flows of Kanawha River at Lock No. 2. A timing of an interval of one day was allowed for comparison between Kanawha Falls, or Lock No. 2, and the mouth of the river.

Q. That is, your estimate is that for the water at Kanawha Falls to reach the other point is 24 hours?

A. That is what is allowed.

Q. Is that your estimate?

A. Yes.

Q. And your estimate is that from the dam site to Kanawha Falls is four days?

A. Yes. The figures at Lock No. 2 beginning July 9, 1918, are for July 9th, 1918, was 4,800; July 10, 3,590; July 11, 3,270; July 12, 3,950; July 13, 3,770; July 14, 4,150; July 15, 3,770; July 16, 3,770; July 17, 3,270; July 18, 3,270.

Q. Did you compute the average with those flows at Kanawha Falls, or not?

A. No.

Q. Did you make any use of those flows?

A. Those were used in arriving at the flows for the following day at the mouth of the river.

Q. You made no use of the average whatever?

A. We did not make the average until we had arrived at our interval-day figures for the mouth of the river and then averaged those.

Q. That is, you estimated the flow at the mouth each day from daily estimates and from the flow at Kanawha Falls and averaged those?

A. Kanawha Falls and any additional area we had on tributary drainage.

716 Q. These figures you have read are from the gauge at Lock 2, as I understood it?

A. Yes.

Q. What is the difference between the flow at Lock 2 and Kanawha Falls, in your judgment, if any?

A. It might differ individual days between one and the other, but for the average period it should not differ materially.

Q. Mr. Pierce, what is the drainage area at Lock 2?

A. The drainage area at Lock 2 is 8,475.

Q. What is the drainage area at the mouth of Kanawha River?

A. About 12,200.

Q. Those are estimates, are they?

A. The area at Lock 2 was one of our remeasurements made in 1935. The figure 12,200 is an older figure which we have been using, and which we did not remeasure.

Q. Can you tell me the ratio between the drainage area at the mouth of Kanawha and the Kanawha Falls, using the Kanawha Falls area as a base—at Lock 2, I mean, the one you have just given?

A. If I get your question right, you mean to ask me for the ratio between the two; you mean the one divided by the other?

Q. Yes, sir.

A. I make it 1.44.

Q. The drainage area at the mouth is 144 percent of the drainage area at Lock 2. Is that right?

A. Yes, sir.

Q. Mr. Pierce, is there any gauge at the mouth of Kanawha River?

A. The Geological Survey has no gauge. I do not know of any gauge; there might be one.

Q. Well, did you use any gauge at the mouth of Kanawha River?

A. No, sir.

Q. Has the Geological Survey any gauge on the Kanawha River further downstream than Kanawha Falls?

A. No, sir.

8 717 Q. Mr. Pierce, when you testified as to the flows at the mouth of Kanawha at various periods of time, am I right in understanding that those are estimates made by you?

A. They are computed figures based on records at other places.

Q. Do they involve any application of your judgment?

A. Somewhat.

By the COURT:

Q. You testified in your examination in chief the other day as to comparison between the volume of flow at the mouth of Kanawha River and at the Radford Dam Site. As I understand it, there is no gauging station at the Radford dam site, is there?

A. No.

Q. And the figures you used were based upon what the station at Eggleston, or computations, rather, from stations both above and below the dam site?

A. For a certain period of time the Eggleston Gauge was the only one available or the only one we had. For periods when there were other gauges we made use of them, so the method differed somewhat, depending upon what gauges there were available.

Q. Your figures as to the flow at the Radford dam site are computations based on known data from other stations?

A. Yes.

By Mr. JACKSON:

Q. Your estimates at the mouth of Kanawha River and at the dam site are not mere calculations based upon figures appearing in this Water Supply Paper, are they?

A. They are based upon definite figures which appear in Water Supply Papers.

Q. The point I am getting at is this: That no one, from the figures in the Water Supply Papers, could by a mere mathematical calculation, involving no judgment, arrive at the estimates which you have given for the mouth of Kanawha or the Radford dam site?

A. I could not give you the same answer for both con-
718 ditions. The computations for the Radford dam site were strictly mathematical computations, and comparisons mathematically is a part of the work in connection with arriving at the figures for the flow of Kanawha River at its mouth, which depends upon certain comparison of data which were not strictly—well, it was mathematically in a sense, but it involved getting the average relation for a certain period from certain data, which would be in a little different category from that at Radford.

Q. That is, there is more of an estimate in the figures for the mouth of Kanawha than there is for the Radford dam site. Is that right?

A. A little bit more. They did not amount to very much in that connection.

Q. Now at the Radford dam site in order to arrive at an estimate of the stream flow at a point where there is no gauge, from estimates of the stream flow made at some other point where there is a gauge is it not necessary to use judgment?

A. I believe that judgment is always necessary in connection with work of this kind, even though it can be put on a strictly mathematical basis. One of the things to determine is what the mathematics are.

Q. How would you make an estimate for the flow at a point on a stream where there is no gauge, from an estimate of the flow at another point where there is a gauge on a strictly mathematical basis, and solely that?

A. I believe that if one based his estimate upon the drainage-area ratio, it would be a mathematical estimate.

Q. Does not that involve an assumption as to what the run-off is in a drainge area?

A. As I said before, in work of that kind it does require the use of some judgment, but when he has arrived at the method then that becomes a mathematical process.

Q. That, of course, would be true of any formula that you work out. If you once accepted that as a rule, the operation of it would become mathematical, wouldn't it? But the question, for instance, of what the run-off of a drainage area would be, is an assumption, is it not?

719 A. It depends upon circumstances and what data are available, whether it is an assumption.

Q. You have got to make an assumption for the run-off, per square mile of drainage area, you have got to assume it is the same, or you have got to assume some arbitrary factor as a basis, have you not?

A. No, sir; if there are records at only one place, and we desire to obtain an estimate of the flow at another place, the common method is to make a comparison of drainage areas, but that is sometimes modified by other factors, such as the rainfall and weather.

Q. Is the flow per square mile of a river at one point the same as at another point?

A. Not necessarily.

Q. When you estimate those flows for points at which you have no gauging station, you have to make an estimate that the rainfall is the same or not the same, don't you?

A. That is about the only thing that can be done in arriving at any idea of what the probable flow is.

Q. In your estimates at the Radford Dam site, did you assume the same run-off, per square mile, as you found for the station which you were using in your estimates?

A. I don't exactly see how that question can be answered. What do you mean by "we found?" If you will read me the question again please.

Q. Read the question. [Question read.]

A. Did we assume the run-off?

Q. Yes.

A. For the period when the record at Eggleston was the only record available, we used the relation of drainage area, took the proportional flow, or the flow as proportional to the drainage areas, but we did have a verification of that assumption by comparison with the results obtained at other times when we had other records and found that they checked very closely.

Q. You used a different ratio when you got down on Kanawha, didn't you?

720 A. I don't understand the question—ratio for what?

Q. The ratio for estimating your flow.

A. Flow for what?

Q. The mouth of Kanawha; that is the only place I understood you estimated it on Kanawha.

A. I did not get your full question. There were, for various periods, time records of tributaries which joined the Kanawha, between Kanawha Falls and its mouth. For these periods of time, when we had records of these tributaries, we made use of them in estimating the inflow between Kanawha Falls and the mouth, and we did—from the data, or from the computations made in those cases, we arrived at a relation between the flow at

Kanawha Falls or Lock No. 2 and the flow at the mouth. We did not use strictly a drainage area ratio in estimating the flow at the mouth, but brought into the picture all the information we had for those times when we had records on the tributaries.

Q. Mr. Pierce, you testified yesterday as to the average maximum daily flow for a period of 58 years, from 1878 to 1935, at Kanawha Falls. Is that right?

A. Yes, sir.

Q. Am I right in understanding that this average is merely an average of 58 estimates for the 58 years indicated by you?

A. That average figure was obtained by taking for each calendar year the average flow of the highest day—24-hour flow—not the peak—but the average flow for 24 hours, or what we call the mean daily discharge, and obtaining an average of those 58 figures, which, in most cases, were probably somewhat above the highest discharge measurements and obtained by inspections of the rating curves, and in making these inspections, the data of the average area and mean velocity of curves were used. It was not just an arbitrary figure—it was arrived at in our regular methods of doing that work.

Q. And similarly, your estimate of the average of the lowest day's flow for each one of the years, from 1878 to 1935, was the arithmetical average of the estimated lowest mean daily flow for each one of those years?

721 A. Yes, sir.

Q. As shown on the Water Supply Papers?

A. Yes, sir.

Q. Those start in 1878?

A. Yes, sir.

Q. When did the United States Geological Survey prepare this first rating curve for Kanawha Falls?

A. I could not tell you, sir.

Q. Don't you know it was a great many years after 1878?

A. Undoubtedly; yes, sir.

Q. Isn't it true that there were no discharge measurements from which rating curves could be plotted for these early years?

A. That is true; yes, sir.

Q. Am I right in understanding that these figures for these old records are the result of the application of rating curves prepared in relatively recent years by the Geological Survey and the old gauge records?

A. Yes, sir.

Q. And I think you have said that the automatic recording gauge was first installed in 1928 at Kanawha Falls?

A. About that time; I don't remember what the date was.

Q. I think that is the year.

A. (Witness examines papers.) I can check it. I have my dates here [indicating papers].

Q. Unless you have some question about it, I am willing to accept that year.

A. 1928 is correct.

Q. When were the stream flow records of Kanawha Falls first published by the Geological Survey?

A. I believe these were first published in Water Supply Papers No. 536. The date of that publication was 1925, which was several years after the computations were made. The computations were probably made, most of them about ten years earlier; some in the later years, which were published about 1918, were made subsequent to 1918. Many of them,
722 however, had been worked up and concluded prior to that date.

Q. For a large part of this period for which you have given the estimated average daily maximum and minimum flows at Kanawha Falls, didn't the Geological Survey depend upon the old Weather Bureau gauging?

A. Yes, sir.

Q. How often a day was the Weather Bureau gauge read?

A. (Witness refers to papers.) It is my understanding that that gauge was read—was originally read once a day; it possibly might have been read more than once a day, but I do not have any information in regard to that.

Q. You have no idea or no knowledge, I should say, that it was read more than once a day?

A. No, sir.

Q. Up to what date do these records depend on the Weather Bureau gauge at Kanawha Falls—I am speaking about Kanawha Falls?

A. From March 28th, 1877, to September 30, 1916, the records were obtained at a station gauge about one and three-quarters miles below the Gauley River. The records at Lock 2, published for the period—were also published January 1st, 1888, to September 30, 1918, and were used at a station gauge on the right bank, a short distance above the upper gates of the lock. The records published in Water Supply Paper No. 728, for the period from October 1st, 1918, to September 30th, 1929, were obtained by use of a gauge—from a record furnished by the Weather Bureau from a gauge 1,800 feet upstream from the site of the water stage recorder now in use.

Q. Mr. Pierce, have you on hand Water Supply Paper No. 536?

A. Yes, sir.

Q. Turn to page 64.

A. (Witness turns to page as requested.)

Q. I direct your attention to a sentence near the middle of the page, as follows: "The ratios of monthly discharge (See table, page 44) are a rough index of the accuracy of the records";
723 and I will ask you to state whether you agree with that statement.

A. Will you complete the reading of the paragraph?

Q. I will be glad to do so, but do you agree with that statement?

A. I agree with the statement that a comparison and index was made—a rough index of comparison was made to show the differences in results obtained at the different stations, and I know that the conclusion was that, in general, the records at this station—which refers to Kanawha River at Kanawha Falls, are good.

Q. Now, will you answer my question, and tell me whether or not you agree with that statement "that the ratios of monthly discharge was a rough index of the accuracy of the records"?

A. I think there can be no question about that.

Q. You agree with it then?

A. Yes, sir.

Q. I thought perhaps you disagreed, because of your reluctance to state that. Turning to page 44, of Water Supply Paper No. 536, will you look at the ratio between Kanawha Falls and Lock 2 for July—what should be the ratio between the readings at Kanawha Falls and Lock No. 2, according to the table?

A. What should be the ratio?

Q. Yes?

A. I don't know what it should be.

Q. What is the ratio of the drainage areas?

A. That is another thing. They have given the drainage area from Kanawha Falls to Lock No. 2 as 0.98.

Q. What is the ratio in your own estimation between the drainage areas at Kanawha Falls and Lock No. 2?

A. I have not made any.

Q. Will you question that this is approximately accurate?

A. The drainage area—the ratio?

Q. Yes, sir?

A. Yes; that is approximately correct for the ratio of the drainage areas. It might not be the ratio of discharge.

Q. Will you tell me what is the ratio of the geological
724 survey's estimates of the discharge for July—for 1889–90, between Kanawha Falls and Lock No. 2?

A. That figure was published here [indicating papers] as .85.

Q. Am I right in thinking that that shows a ratio of thirteen percent less than the ratio between the drainage areas at the top of the page?

A. There is approximately that much difference from the drainage areas ratio.

Q. Look at page 45, at the estimates for July 1897, and tell me what is the ratio between the flows—the estimates of flow for Kanawha Falls and Lock No. 2.

A. 1.14.

Q. And that is sixteen percent greater than the ratio between the drainage areas?

A. Yes, sir.

Q. Turning to page 47, will you tell me what is the ratio between the estimates of flow at Kanawha Falls and Lock No. 2, for August 1915, as shown by Water Supply Paper No. 536?

A. That ratio is given here as 1.20.

Q. And that would exhibit a difference of twenty-two percent, or a divergence of twenty-two percent from the ratio between the drainage areas?

A. Yes, sir.

Q. Mr. Pierce, you testified that the mean flow on Little River, at its mouth, for a period of 28 years, is 401 second-feet.

A. (Witness examines paper.)

Q. For a period of 28 years, ending September 30, 1935?

By Mr. THOMPSON:

Will you read the question? (The question is read.)

By Mr. JACKSON:

I will add to the question.

Q. For a period of 28 years ending September 30, 1935?

A. That is correct, sir.

Q. Did you have any gauge station at the mouth of Little River?

A. There was no gauging station at the Mouth of Little
725 River, but my answer as to this figure was obtained from the duration of flow, which, for the 28-year period, ended September 30th, 1935.

Q. Did the preparation of the duration of flow curves involve any estimate or judgment?

A. It did.

Q. For what period in this 28 years did you have any gauging stations on Little River at all?

A. We had a gauging station near Copper Valley from July 25th, 1908, to September 30th, 1916, and on Little River at Graysontown from October 27, 1928, to September 30, 1935.

Q. A total of 15 years?

A. Yes, sir.

Q. And there were 13 years of this period that you made estimates when there were no gauging stations at any place on Little River?

A. Yes, sir.

Q. There is one correction that I want to briefly call to your attention; on page 1484, of the present record, there is this question:[4] "Q. Do you know what percentage or time the flow above Little River is below 7: second-feet?" And your answer is: "A. About 99.5 percent of the time." Should that word "below" be "above?"

By Mr. THOMPSON:

Yes, sir; that should be "above."

By Mr. JACKSON:

Q. Do you agree with that?

By the WITNESS:

Yes, sir.

Redirect examination by Mr. THOMPSON:

Q. You testified about a change in the area—the drainage area on Little River at some time in the past, as compared with the recent study that you have made. Is that the only substantial variation that you have had in the New River drainage area in the new figures that you have gotten out?

726 A. I think that was the largest difference we found, and it was, by far, the greatest percentage difference, and I am sure it is also the largest difference in actual area.

Q. Could you give any other figures showing changes?

A. I can give the figures as originally previously used and the new figures. I have them tabulated here [indicating].

Q. You have them tabulated?

A. Yes, sir; I have them here [witness produces papers]. A comparison of areas obtained from measurements in June 1936, with those previously used are: New River at Eggleston, June 1936, the measurement was 2,941.43 square miles; previously used 2,945.

Q. What was the difference there?

A. The difference there was about 3½ square miles, and we only used to the nearest square mile.

Q. What percentage would that be?

A. About .01 of one percent.

Q. Give the next one.

By the COURT. You mean one-tenth of one percent. Wouldn't it be that?

[4] See footnote, page 457.

By Mr. THOMPSON. What is that, Your Honor?

By the COURT. He said about .01 of one percent. I thought it would be one-tenth of one percent, because there is a three-miles difference in an area of 3,000 miles.

By the WITNESS. I am wrong, sir. It would be one-tenth of one percent. New River at Radford, June 1936, measurement 2,736.24; previously used 2,720 up until 1906, for which was used the figure of 2,726.

Q. What is the difference there in square miles?

A. Ten square miles.

Q. What percentage is that?

A. That is about one-half of one percent.

727 Q. Have you any other changes?

A. New River at Allisonia, measurement, June 1936, 2,202.4 square miles. Previously used 2,193 square miles, a difference of 9 square miles, which was about .4 of one percent.

Q. Now, those figures mean practically nothing in estimating the stream flow—those changes?

A. So far as the record of daily discharge, it means nothing whatever. It means nothing in the published records except in computation of the run-off in second-feet per square mile.

Q. You testified, in reply to a question, that the geological survey at one time had an estimated survey of 195 square miles at the Copper Valley station, and that subsequently, under your estimate, it was 238 square miles. Would that have any effect on the flow of Little River at the Copper Valley station or at any other point?

A. No, sir.

By Mr. JACKSON:

In the flow or the estimate of the flow?

By Mr. THOMPSON:

In the flow.

Q. How about on the estimates?

A. It would have no effect on my estimates, because we used the correct figure.

By Mr. JACKSON:

You mean the correct figure for the flow?

A. For the drainage area.

By Mr. THOMPSON:

Q. You spoke of the geological survey taking their data from the Weather Bureau gauging station near Kanawha Falls. Who read that gauging station?

A. I believe that it was read by some man employed in the Army Engineers.

By Mr. JACKSON. We move to strike that answer from the record, if he does not know.

By Mr. THOMPSON. Q. What was your understanding about his office there?

By Mr. JACKSON. We object to that.

The objection is sustained.

By Mr. THOMPSON:

Q. Where is the gauging station located at Kanawha Falls?

A. The present gauging station is about 200 feet down-
728 stream from the toll bridge.

Q. And where is the gauging station for Lock No. 2?

A. The description of the gauging station for Lock No. 2, I think, that is published in Water Supply Paper, No. 536 [witness produces book]. Its location at Lock 2 is three-fourths of a mile below the Chesapeake and Ohio Railway Station, at Montgomery, in Fayette County.

Q. That is below Kanawha Falls, is it?

A. Yes, sir.

Q. Do you know where the electro-metallurgical power plant is located?

A. Yes, sir.

Q. Do you know where the dam is located for that power plant?

A. Yes, sir.

Q. Where is it located?

A. At Kanawha Falls.

Q. You testified that on August 15th, 1930, that there was a larger flow at the Caperton gauge than there was at Lock No. 2 gauge. Is that correct?

A. Yes, sir.

Q. Could that have been caused by the sudden stopping of the flow of water at the electro-metallurgical dam?

A. I think it could have been.

By the COURT:

Do you mean the flow from Caperton to Kanawha Falls, or Lock No. 2?

A. Yes, sir.

Q. What is the time interval from Caperton to Kanawha Falls—is it as much as 24 hours?

A. I think not, sir; I think it would vary with the stage of the River, but I don't believe it would be 24 hours.

By Mr. JACKSON:

It would not be over 8 hours, would it?

A. I could not s y; I have not studied that.

729 By Mr. THOMPSON:

Q. Do you know the distance between the two places—Caperton and Lock No. 2?

By Mr. JACKSON:

Mr. McWhorter said it was 19 miles.

By the COURT:

He said it was 19 miles to Kanawha Falls.

By Mr. JACKSON:

Not from Lock No. 2.

By Mr. THOMPSON:

Q. How far down is Lock No. 2 from Kanawha Falls, if you know?

A. I don't know the exact distance.

Q. It is about 2 miles, isn't it?

A. Something like that.

Q. So approximately the distance was 21 miles between Caperton and Lock No. 2?

A. That may be.

By Mr. JACKSON:

I understand that the gauge reading is at a Kanawha Falls and not at Lock No. 2.

By the COURT:

You asked the same question about a specific day, on which the reading at Kanawha Falls was one thousand and something, and at Caperton was eleven hundred and something.

By Mr. JACKSON:

That was the average and we asked about the maximum and the one at the lower end was Kanawha Falls and the other at Caperton, and I assume that the distance that they are interested in is between these points and not Lock No. 2.

By the COURT:

The witness said, Mr. Thompson, that this reading was at Lock No. 2—I mean he said that it was at Kanawha Falls.

By Mr. THOMPSON:

The witness says that I am incorrect.

Q. It was at Kanawha Falls?

730 A. Yes, sir.

Q. But that station is below the falls?

A. Yes, sir.

Q. That is about 19 miles from Caperton to Kanawha Falls?

A. Approximately that.

Q. That is at one of the steepest parts of the river from Caperton to——

A. (Interrupting.) Yes, sir.

Q. (Continuing.) To Hawks' Nest?

A. Yes, sir.

Q. Or Kanawha Falls?

A. Yes, sir.

Q. You read from Water Supply Paper No. 536 a comparison of ratios of drainage areas and ratios of discharge. What in your figures was the relationship between drainage area and discharge as applied to your estimates?

A. Which of my estimates—the mouth of the river?

Q. Those at Radford?

A. I had information to substantiate my assumption that the discharge at the Radford dam site was nearly in proportion to the drainage area of that at Eggleston. I believe that is the ratios generally used and I obtained my substantiation of that assumption by comparison with figures obtained from the Radford dam site and other periods when there were records at Allisonia, and a station at Graysontown, on Little River.

Q. How did you estimate the flow of Little River at the time the gauge records were not available?

A. That was done from the duration of flow, by obtaining the mean ordinate of the curve.

Q. What is that? Read that answer. (The answer is read.) What is an ordinate?

A. An ordinate—that is the duration of flow of the curve line. That was made with a certain area along the curve line between the line and the axis to which the curve is re-
731 ferred. If we took the same area along a straight line, then the height of that distance, of that straight line above the base, would be the mean ordinate.

Q. State whether or not you followed, in arriving at these estimates of yours and figures, the customary methods used by the United States Geological Survey.

A. Yes, sir.

Q. Are these methods generally accepted in engineering computations in the engineering world?

A. I think they are, so far as my experience has gone.

732 GLEN E. EDGERTON

Direct examination by Mr. THOMPSON:

Q. Colonel, will you please state your name, residence, and occupation?

A. Glen E. Edgerton; residence, Washington, D. C. I am an officer of the Corps of Engineers, United States Army, at present on duty in the office of the Chief of Engineers.

Q. What department of the Chief of Engineers do you have at this time?

A. I have the River and Harbor section of his office.

Q. Will you please give a statement of your schooling and experience as an engineer?

A. My schooling began in the city schools of Council Grove, Kansas. I graduated from the Agricultural College of Kansas in 1904 in mechanical engineering and took an advanced degree in civil engineering in 1916. I entered the United States Military Academy in 1904, graduated in 1908. I served continuously since in the corps of engineers. I served as engineer on the Panama Canal, as Chief Engineer of the Alaska Road Commission, as District Engineer at Jacksonville, Florida, District Engineer at Rock Island, Illinois, as Assistant Chief Engineer and Chief Engineer of the Federal Power Commission, as Professor of Engineering at the United States Military Academy and in numerous other military and nonmilitary assignments. I graduated from the Engineers School, United States Army, and Command and General Staff School of the United States Army.

Q. Colonel, when did you go with the Federal Power Commission?

A. In June of 1924.

Q. How did you come to go there?

A. I was assigned there by War Department orders. The Chief Engineer and a number of the assistants were de-
733 tailed from the War Department to establish a staff of the Federal Power Commission. The Chief Engineer was at that time by law an officer of the corps of engineers.

Q. What position did you occupy when you first went there?

A. Assistant Chief Engineer.

Q. When did you become Chief Engineer?

A. In May of 1925.

Q. What were your duties as Chief Engineer of the Commission?

A. Well, I had charge of the engineering division. All matters of engineering import that came before the Commission were handled through that division. I also acted as Executive Secretary in charge of the entire office in the absence of the Executive Secretary. In general, the duties were all of those that involved any engineering matters, preparation of engineering reports, the handling of applications for preliminary permits, declarations of intention, applications for licenses and all correspondence connected with those matters.

Q. Colonel, I hand you what is marked for identification Government Exhibit No. 88 and ask you if you know what that is?

A. That is a Declaration of Intention by the New River Development Company covering a prospective project on the New River in the vicinity of Radford.

Q. When was that filed?

A. It was filed on June 26th, 1925, dated June 25, 1925.

Q. Do you recall the time when that was filed?

A. Yes, sir.

Mr. THOMPSON. This is one of the documents, your Honor, that, under stipulation, it was agreed there would be no objection to.

Mr. JACKSON. There is no objection to the receipt of this exhibit. I want to make it clear, however, that the lack of objection is not a concession either that this witness would be a competent witness for proving documents in the possession of the Commission, or that documents so proved will be admissible, but we have no objection to this one.

Mr. THOMPSON. I offer that in evidence, your Honor.

NOTE.—This paper was filed and marked Government Exhibit No. 88.

Mr. JACKSON. I want the record to show that the exhibit is not complete in that the maps which accompanied it are not attached to the exhibit, and we will reserve the right to supplement it if that seems to be essential. May that be understood?

The COURT. All right.

Mr. THOMPSON. We would like very much to get a copy of that map.

Mr. JACKSON. I should think it would be appropriate to get it from the custodian of the files of the Federal Power Commission.

By Mr. THOMPSON:

Q. Colonel, I hand you what is marked for identification Government Exhibit No. 89 and ask you to look at that and state whether you know what it is?

A. It is an assignment of the right and interest of the New River Development Company to the Appalachian Electric Power Company which accompanied an application for license by the latter company.

734 Q. Do you recall that being filed with the Commission?

A. Yes.

(Exhibit 89 offered in evidence.)

Q. I hand you what is marked for identification Government Exhibit No. 90 and ask you if you know what that is, purporting to be the application for license by the Appalachian Electric Power Company?

A. This is a copy of the application of the Appalachian Electric Power Company for a license for a proposed project at Radford, Virginia, on New River, received on September 4, 1926.

Q. Do you recall that being filed with the Commission?

A. Yes.

(Exhibit 90 offered in evidence.)

By Mr. THOMPSON:

Q. I hand you what is marked for identification Government Exhibit No. 90–A, purporting to be a series of maps, and ask you to look it over and tell what it is?

A. These are copies of Exhibits J, K, L–1, L–3, L–4, and L–5, accompanying the application for a license by the Appalachian Electric Power Company and also another map marked Exhibit J showing the general location of proposed development No. 6, so-called, on New River, and L–1, L–2, and L–3, L–4 and L–5 of the exhibits accompanying the application for license are apparently the originals for which the preceding copies were substituted, and the maps giving duration curve for the period 1914 to 1925, marked Exhibit 1–A, which accompanied application for license to which I have just referred.

Q. Do you recall that being filed with the Commission?

A. Yes, sir.

By Mr. JACKSON:

Q. When were you with the Commission?

A. From May 1925 to August 1929.

Q. I wonder if inadvertently you overlooked the fact that these maps were prepared in 1930, Colonel, and these are, in fact, I am told, the maps that were subsequently submitted with an application for a minor part license, and the only thing I am interested in is getting the record straight.

735 A. As I meant to state, the later maps, later referred to in my remarks, appear to be the originals for which revisions were substituted and the revisions are bound in the first part.

By Mr. THOMPSON:

Q. You stated that in your testimony?

A. Yes, sir.

By Mr. JACKSON:

Q. The maps dated in 1930 are those which were submitted with the application for a minor part license and the maps which are dated in 1925, referring in each instance to Exhibit 90–A, are the maps which accompanied Exhibit 90?

A. Yes.

Q. May that be understood?
A. Yes, sir.
(Exhibit 90–A offered in evidence.)

By Mr. THOMPSON:

Q. Do you remember who was District Engineer while you were Chief Engineer of the Commission—the District Engineer at Huntington?

A. Major H. L. Trippe was District Engineer at Huntington. Except for a short period when Major A. K. B. Lyman took his place until he was relieved—the dates I cannot remember—by Major E. D. Ardery.

Q. H. M. Trippe, I believe?
A. Very likely.

By Mr. JACKSON:

Q. Col. Edgerton, you left the Power Commission in 1929?
A. August 1929.

Q. And since that time you have had no official connection with that Commission?
A. No, sir.

Q. And you do not now have custody of any of the files or records of that Commission?
A. No.

Q. Your duties do not include anything with reference to those files or records at the present time?
A. No, sir.

(Exhibit 91 was offered for the limited purpose of showing the nature of the investigation made by the Federal Power Commission in connection with Defendant's project and not as proof of any other fact, and not as evidence of the correctness of any statement, recital, or conclusion contained therein and was admitted for such limited purpose over Defendant's objection and exception.)

By Mr. THOMPSON:

Q. Col. Edgerton, I call your attention to page 116,
736 where it says "The 77th meeting held in the office of the Secretary of War, March 2, 1926. Meeting called to order 3:45 P. M.," and I ask if you were present at that meeting?
A. Yes, sir; I was present.

Q. When you were in the Commission and attended these meetings, or did you attend the meetings of the Commission?
A. Most of them, unless I was absent from the city; yes, sir.

Q. And when you were present at the meetings, did you take any part in the meetings?
A. Yes, sir.

Q. Did you take any part in the particular meeting of March 2, 1926?

A. Yes, sir; I took some part.

Q. When the minutes were prepared, did you have anything to do after the meeting with regard to those meetings?

A. Yes, sir. I reviewed the minutes to see there was no error in them, and to see they correctly represented the transaction of business at the meeting.

Q. And who else did that, if you know?

A. They were finally approved by the Executive Secretary and sent to the Records with copies to the three members of the Commission.

Q. Did you ever act as Executive Secretary, Col. Edgerton?

A. Yes, sir; many times.

Q. Was it the rule you acted as Executive Secretary in the absence of the Executive Secretary?

A. Yes, sir.

Q. Please have reference to page 129. In what report was that meeting referred to or reported or set forth?

A. The 78th Meeting, the minutes of which occurred in 737 the report for 1926.

Q. Were you present at that meeting?

A. No, sir.

Q. Did you see the minutes of that meetings after the minutes were prepared?

A. Yes, sir.

Q. Did you check on those minutes?

A. Yes, sir.

Q. Does that state accurately what happened at that meeting?

A. Yes, sir.

Q. Now refer to the next one, March 26, 1926, you state you were not present at that meeting?

A. No, sir.

Q. But you did go over the minutes and check them?

A. Yes, sir.

Q. Now please turn to the Annual Report of the Federal Power Commission for the year 1927, pages 111, 113, and 114, and also for the 88th meeting held in the office of the Secretary of War June 1, 1927. Please state if you were present at that meeting?

A. I was.

Q. Did you check on those minutes?

A. Yes, sir.

By Mr. JACKSON. May it be understood this is all objected to; that subject to our objection the documents have been received in evidence and we have raised no objection to the correctness of the documents, but only as to their competency.

By the COURT:

Yes.

Q. Does that state what happened at that meeting, with accuracy?

A. Yes, sir; substantially.

Q. State if you know what was done with the Declaration of Intention when it was filed?

A. It was referred to the Chief of Engineers for field investigation and report and referred by him to the District Engineer at Huntington for field investigation and report to the Chief Engineer. Report was made and study made in the District Office and it was embodied in a report which was transmitted to the Chief of Engineers through the Divisional Engineer.

738

Q. Do you remember about what date it was transmitted?

A. Well, it was transmitted about the 23rd of July 1925.

Q. I hand you what purports to be a report dated August 20, 1925, signed by Major General Taylor, marked for identification, Government's Exhibit #92, and ask you what that is?

A. That is a copy of the report submitted by the Chief of Engineers upon the completion of the field investigation of the Declaration of Intention of the New River Development Company.

Q. When was that received?

A. August 22, 1925, in the Federal Power Commission office.

Q. I hand you a document dated July 23, 1925, signed by Major A. K. B. Lyman, and purporting to be a report from Major Lyman to the Chief of Engineers, marked for identification Government Exhibit #93, and ask you what it is?

A. It is the report prepared in the District Office on the results of the field investigation of the Declaration of Intention of the New River Development Company.

Q. State if that accompanied the report of August 20, 1925, marked Government Exhibit #92?

A. It was received by the Federal Power Commission on or about the time the original report was received. I think it was transmitted with it.

Q. I believe——[interrupted].

Q. I believe you stated what dates those were received by the Commission.

A. Except the report of the District Engineer. I see no received mark, but it was about the time the report of the Chief of Engineers of August 20, 1925, was received.

Q. Do you happen to know why this report of the District Engineer is signed by Major A. K. B. Lyman?

739

A. Major Trippe was temporarily absent at the time the report was submitted, and Major Lyman, at Cincinnati, was

assigned that duty in addition to his other duties, consequently he signed the report.

(Exhibits 92 and 93 offered in evidence.)

Q. I hand you a document marked for identification "Government Exhibit #94," dated October 15, 1925, and signed by Major H. M. Trippe, and ask you to look at that and tell, if you know, what it is.

A. It is a letter from Major Trippe, the District Engineer at Huntington, to me, enclosing memorandum on the probable effects of the proposed New River Development Company project on the Kanawha River, submitted in response to my oral request.

Q. When did you make the oral request?

A. October 10, 1925.

Q. Where were you when you made it?

A. Huntington.

Q. Why did you go to Huntington?

A. To obtain first hand as much information as I could get of the character and scope of information available there on the difficulties of navigation on the Kanawha and probable effects of this project on the Kanawha River.

Q. And at that time you asked him to prepare data for you?

A. Yes, sir.

(Exhibit 94 offered in evidence.)

By Mr. JACKSON:

X Q. Col. Edgerton, this letter and memoranda which has been marked "Exhibit #94" for identification, did not pass through the regular course of official communications of the Corps of Engineers, did it?

A. No, sir.

X Q. Had it done so, it would have been referred to the Divisional Engineer and Chief of Engineers, etc.?

A. Copies were referred to them.

X Q. But this particular document, it did not go that way?

A. No, sir.

X Q. And you were at Huntington and simply asked
740 Major Trippe to write you a personal letter in regard to some information you had asked about?

A. The circumstances if you want them elaborated on—— [interrupted].

X Q. I just want to know if that isn't so?

A. I went to Huntington to get this information orally from Major Trippe or in any form it might be.

By Mr. THOMPSON:

Q. Were you Chief Engineer at this time of the Commission?

A. Yes, sir.

A. (Continuing.) And I didn't see him all day. I saw him late in the evening and I could not stay any longer, and we discussed the matter, and I asked him to put it all down in writing for my benefit.

By Mr. JACKSON:

Q. And he simply wrote you for your personal information about certain inquiries you had been making, is that right?

A. Yes, sir.

Q. And Major Trippe was not subject to your command or order, was he?

A. Not directly.

Q. He was under no obligation to comply with your request, by statute?

A. No statutory obligation.

Q. No regulation of the War Department obligated him to comply with your request?

A. No formal request made.

By Mr. JACKSON. We object to this because it was not a formal communication.

By Mr. GATCHELL:

Q. Col. Edgerton, did you consult Major Trippe in your official capacity as Chief Engineer of the Federal Power Commission?

A. Oh, yes.

Q. Did he report to you as Chief Engineer?

A. Yes, sir.

Q. Was he the field representative of the Federal Power Commission? I mean at the time he made this report.

A. Yes, sir.

By Mr. JACKSON;

Q. Isn't it true Major Trippe whenever he reported officially, reported through the Chief of Engineers?

741 A. Well it depends on the meaning of the word official. His regular course of correspondence was through the Chief of Engineers.

Q. He was not authorized to make reports to anyone else?

A. He was authorized to give the Engineers any information he had at any time.

Q. But not to make official reports?

A. I don't know about that, it depends on what you mean by official.

By Mr. GATCHELL:

Q. Col. Edgerton, was it the invariable practice of Major Trippe, as representative of the Federal Power Commission to submit all reports through the Chief of Engineers?

A. I think so.

(Exhibit No. 94 was offered for the limited purpose of showing the nature of the investigation made by the Federal Power Commission in connection with Defendant's project and not as proof of any other fact, and not as evidence of the correctness of any statement, recital, or conclusion contained therein and was admitted for such limited purpose over Defendant's objection and exceptions.)

Q. I hand you, marked for identification, Government Exhibit No. 95, being a letter dated April 7, 1926, addressed to Major General Taylor and signed by Mr. Merrill, Executive Secretary, with chart and memorandum attached, and will ask you if you know what that is?

A. Yes, it is a copy of a letter from the Executive Secretary to the Chief of Engineers transmitting chart showing results of observations on certain stream flow studies on the Pit and Sacramento Rivers, accompanied by a memorandum prepared by one of the engineers in my office, transmitting to the Chief of Engineers in accordance with the request of the Commission.

Q. Please read the last line in that letter.

A. "Early consideration of these data and expression of your opinion with respect to them would be appreciated."

By Mr. THOMPSON. I desire to offer this letter in evidence.

By Mr. JACKSON. Subject to our objection and, of course, the Court has ruled on it.

(Said letter dated April 7, 1926, together with chart and memorandum attached, is here filed, marked Govt. Exhibit 95.)

Q. I now hand you letter marked for identification Govt. Exhibit 96, being a letter addressed by General Deakyne, to the Executive Secretary of the Federal Power Commis-
742 sion, dated July 23, 1926, and will ask you if you know what that is?

A. Yes; it is a report made by the Acting Chief of Engineers, and showing the receipt of a letter just mentioned.

Q. What is the date of the receipt of that letter by the commission?

A. July 31, 1926.

(Exhibit 96 offered in evidence.)

Q. I hand you, marked for identification Govt. Exhibit No. 97, purporting to be a report from General Taylor dated December 29, 1925, addressed to the Executive Secretary, and will ask you what that is, if you know?

A. It is a report by the Chief of Engineers to the Federal Power Commission in reconsideration of previous reports at the request of the Declarant.

Q. I call your attention to the letter number in the right-hand corner, and will ask you what that is?

A. It says "duplicate copy," indicating that this photostat is made from the retained copy and not from the original.

By Mr. THOMPSON. I desire to offer this in evidence.

By Mr. JACKSON. No objection. I understand it is offered for all purposes.

By Mr. THOMPSON. It is offered for the same purpose as all the other documents, for the purpose of showing the investigation and what was before the commission.

(Said letter is filed, marked Govt. Exhibit 97.)

Q. State, if you know, what became of this report of December 29th, 1925, from Major General Taylor to the Federal Power Commission.

A. It was returned to the Chief of Engineers.

Q. About what time was it returned?

A. I think in the spring of 1926, about the early part of April.

Q. And upon whose request?

A. I think on the Chief of Engineers' request.

Q. Was that report ever returned to the Federal Power Commission, so far as you know?

By Mr. JACKSON. We object to the question. It does not matter whether he knows or not.

By Mr. THOMPSON. I am asking as far as he knows.

By Mr. JACKSON. I do not think that is a proper way of proving it. He left there in 1929.

By Mr. THOMPSON. The report went back long before 1929. He states it went back in the early part of 1927.

Q. State whether or not it went back before the time the Commission made its findings, June 1, 1927.

A. I think it went back in 1926.

Q. The early part of 1926?

A. Yes, sir.

743 Q. When was the last time you ever saw this report?

By Mr. JACKSON. We object to the question as irrelevant and incompetent.

A. About three weeks ago.

Q. Where was it?

A. In the office of the Chief of Engineers, in his file.

Q. In Washington, D. C.?

A. Yes, sir.

Q. Was that the original report?

A. Yes, sir.

Q. I hand you, marked for identification, Govt. Exhibit 98, purporting to be a report dated April 12, 1927, signed by Herbert Deakyne, Brigadier General, Acting Chief of Engineers, together with an apparent supporting report to the Chief of Engineers, signed by Major H. M. Trippe, dated December 22, 1926, both documents marked "received by Federal Power Commission as of April 14, 1927," and will ask you if you know what that document is?

A. Yes; it is the report of the Chief of Engineers to the Executive Secretary on the application of the Appalachian Electric Power Company for a license for power development on New River, near Radford, Virginia; accompanied by a report of the District Engineer at Huntington, on the same subject, dated December 22, 1926, and bearing the first endorsement of the Division Engineer, central office, dated January 13, 1927.

Q. Who was that?

A. Col. C. W. Kutz.

Q. Do you recall that report coming to the Commission?

A. Yes, sir.

Q. Were you present at the meeting of June 1, 1927, of the Commission?

A. Yes, sir.

(Exhibit 98 offered in evidence.)

By Mr. THOMPSON:

Q. Was the report of Major General Taylor of December 29, 1925, before the Commission at that time?

By Mr. JACKSON. I object to the question. I do not think it is a competent way of proving a record.

By the COURT. I will let him answer it.

By Mr. JACKSON. We desire to take an exception.

A. No, sir; it was not.

By Mr. THOMPSON:

Q. State whether or not this report of General Deakyne
744 was before the Commission.

A. Yes, sir; it was.

By Mr. THOMPSON:

Q. State whether or not the Commission had knowledge of this report.

A. It did.

Q. State whether or not this report was discussed before the Commission.

A. It was.

Q. I will ask you to read into the record paragraph 12 of General Deakyne's report:

A. "12. I concur in the recommendation of the District Engineer that a license be granted the applicant provided it is subject to the following conditions, articles 3, 4, 5, 7, 8, 9, 10, 11, 12, 15, 16, 19, 22, 23, 24, 25, 26, 27, 28, 29, 30, of license No. 432, and to the following condition:

"The licensee shall at all times discharge a minimum of 8,050 acre-feet per week over or through the dam. Whenever the flow at Lock No. 2, Kanawha River, falls below 1,400 second-feet the licensee, when so directed by the Secretary of War, shall discharge in each 24 hours the minimum flow of the river during that period up to a discharge of 1,150 acre-feet. The above discharge shall at all times be regulated by such rules and regulations as the Secretary of War may prescribe to prevent interference with navigation on the Kanawha River."

By the COURT:

Q. Was a license ever tendered on those terms?

A. I do not know.

745 By Mr. THOMPSON:

Q. Colonel, I hand you, marked for identification, Govt. Exhibit 99, apparently consisting of a list of affidavits submitted to Federal Power Commission for consideration upon Declaration of Intention of New River Development Company, by Appalachian Electric Power Company. I will ask you to look that over and see if you know what it is.

A. They appear to be affidavits concerning New River, submitted in connection with the representation of the Declarant in the matter of the proposed Radford Project.

Q. What is the date of the reception of that document?

A. I cannot read it, it is not very clear.

Q. October 22, 1925; it that right?

A. Yes, sir.

(Exhibit 99 offered in evidence.)

Q. Did the Commission know about those affidavits?

A. Yes, sir.

Q. I hand you, marked for identification, Govt. Exhibit 100, purporting to be a hearing before the Federal Power Commission, dated March 2, 1926, the stenographer being Douglas O. Morgan, and will ask you, if you know, what it is?

A. It is a copy of the stenographer's record of a hearing held before the Commission on the Declaration and Intention of the New River Development Company on March 2, 1926.

(Exhibit 100 offered in evidence.)

Q. I hand you a document consisting of a number of pages, marked for identification Government Exhibit 101, and dated from the War Department, U. S. Engineer Office, Huntington,

W. Va., September 28, 1926, apparently received by the Federal Power Commission, on January 15, 1927, and will ask you if you know what that is?

A. It consists of notice of public hearing held by the District Engineer, of Huntington, W. Va., on the application of the Appalachian Electric Power Company.

By Mr. JACKSON:

746 Q. For what?

A. For a license. Accompanied by a list of persons to whom sent, and letter to newspapers giving notice of the hearing and the report of the hearing itself.

Q. Was that received by the Commission?

A. Yes, sir; on April 14, 1927.

Q. Did you ever see it before?

A. Yes, sir.

Q. In the Commission?

A. Yes, sir.

By Mr. THOMPSON. I desire to offer this paper in evidence. (Document filed, marked Govt. Exhibit 101.)

By Mr. JACKSON. In addition to the objections we have already made to this line of testimony, I wish to make the further objection that this exhibit shows on its face, and the testimony of the witness shows it has to do with a hearing for application of the Appalachian Electric Power Company for license and has nothing whatever to do with the hearing upon Declaration of Intention, which is the point in controversy here.

By Mr. THOMPSON. It covers both Declaration of Intention and the Application for a license, and it all occurred prior to June 1, 1927.

By Mr. JACKSON. An entirely different proceeding, and it was carried on concurrently, with the idea that there would be less delay. It further appears that it is a hearing not before the Commission but before Col. Trippe.

By Mr. THOMPSON. I believe you said Major Trippe was acting as a representative of the Federal Power Commission, was he not?

A. Yes, sir.

By Mr. THOMPSON:

Q. Was this document received by the Commission?

A. Yes; on April 14, 1927.

By the COURT. What is the objection to it?

By Mr. JACKSON. The only point involved here is the question of whether or not there was any valid order based upon Declaration of Intention. This had, or this hearing had, nothing to do

with the Declaration of Intention, but only application for license.

By Mr. THOMPSON. In view of what counsel have said, may I read a statement at the beginning of the hearing held at Radford? It is very brief.

By the COURT. Go ahead.

By Mr. THOMPSON. "Summary of Proceedings at Public Hearing, held in the Court room of the Corporation Court for the City of Radford, Virginia, on October 28, 1926, in the matter of the Application of the Appalachian Electric Power Company for license under the Federal Power Act to construct a project of water-power development on New River at a point one mile above the mouth of Little River and seven miles above the City of Radford."

By Mr. JACKSON. That is exactly what I said.

By Mr. THOMPSON. This says "application for license."

By the COURT. His objection is that under the statute when Declaration of Intention is filed an investigation shall be made.

By Mr. THOMPSON. I probably should not encumber the record, and I think the Court understands what we are doing showing the steps leading up to this finding under section 23 that was made by the Commission and showing the opportunity that the other side had to present their case and what the Commission was advised of.

By Mr. JACKSON. It is not a step in the matter under investigation, though.

By the COURT. I will let you put it in.

By Mr. JACKSON. We desire to except.

By Mr. THOMPSON:

Q. I show you a letter dated September 2, 1926, signed Curtis, Mallet, Prevost, Colt & Mosle, addressed to the Federal Power Commission, Washington, D. C., marked for identification Government Exhibit 102, and will ask you if you know what that is?

A. It is a letter from the attorneys for the Declarant, in which they advise——

By Mr. THOMPSON:

Q. When was that letter received by the Commission?

A. September 4, 1926.

Q. In view of what counsel said, I would like to have you read the last paragraph on the first page of the letter.

A. "Under the circumstances, we request that action on the Declaration of Intention, referred to in your letter of August 19, 1926, addressed to New River Development Company, be deferred

for consideration at the same time as the Application for License by Appalachian Electric Power Co."

(Exhibit 102 offered in evidence.)

By Mr. JACKSON:

Q. Col. Edgerton, will you please read the paragraph ahead of the one you read on Exhibit 102?

A. "In order to expedite matters, Appalachian Electric Power Company is adopting the suggestion made by you in your
747 letter of July 1, 1925, and is submitting herewith an application for a license for the proposed project, upon the understanding that such application can be withdrawn if it should develop that a Federal license is not required."

Q. I show you five pages of a Western Union telegraph blank, on which there appears to be a lengthy telegram, which is marked for identification as the Government's Exhibit No. 103, and I will ask you if you know what that is.

A. It is a telegram from the Acting District Engineer of the United States Forestry Service, in San Francisco, to the Executive Secretary of the Federal Power Commission.

Q. Whose name is signed to that?

A. Mr. Kramer's name.

Q. Who is Mr. Kramer?

A. Mr. Kramer was an assistant to the District Engineer of the Forestry Service, in San Francisco.

By Mr. THOMPSON:

Q. Did you tell what that was in response to—this telegram?

A. No, sir; I did not.

Q. Tell us, if you know, what this telegram is in response to.

A. No, sir; I do not know.

By Mr. THOMPSON:

Q. You do not know what that is in response to?

A. No, sir.

By Mr. THOMPSON. If your Honor please, we have mislaid the telegram that was sent, in which this is in response to, and we will try to find it. In the meantime, that has been identified, and we will offer it in evidence.

By Mr. JACKSON. We object to that, because it is not competent. It appears on its face that it is not an official communication, and there is no basis laid for its reception.

By Mr. THOMPSON. It is an official communication. It is the result of a study made of the Pit and Sacramento Rivers. It asks that a study be made and this is the telegraphic reply. We will put a witness on later that signed this telegram.

By the COURT. The witness testified that this telegram was information obtained by the Commission. Did he testify that the

telegram and the information in it was before the Commission?

By Mr. THOMPSON. I will ask him.

By the COURT. You are introducing it simply as some more data upon which the Commission acted?

By Mr. THOMPSON. Yes, sir. In the reports of March 26th, I think it is, all of this transaction is referred to, March 26, 1926, this is all referred to. What was your Honor's question?

By the COURT:

Q. As to whether or not it was before the Commission.

A. Yes, sir; it was.

By Mr. THOMPSON. I offer it in evidence as the Government's Exhibit 103.

By Mr. JACKSON. We except to it for reasons stated.

By Mr. THOMPSON:

Q. When was that received?

A. December 9, 1925.

Q. I hand you a document—the photostatic copy of a document, together with a number of charts attached to it, dated December 15, 1925, addressed to the Executive Secretary of the Federal Power Commission, and signed by Mr. F. E. Bon-
748 ner, District Engineer, by E. W. Kramer, Acting, and I ask you what that is.

A. This is a report to the Federal Power Commission by the District Engineer of the United States Forestry Service in California on certain stream-flow measurements made on the Pit and the Sacramento Rivers at the request of the Commission.

Q. Was that information contained therein presented to the Commission?

A. Yes, sir.

By Mr. JACKSON. We object to that, because it appears on its face that it is not an official communication. We make that objection in addition to our general objection.

By Mr. THOMPSON:

Q. I hand you a letter on the United States Forestry Service paper, together with maps and data, signed by Mr. F. E. Bonner, District Engineer, addressed to the Executive Secretary of the Federal Power Commission, dated May 2, 1927, and ask you if you know what that is?

A. Yes, sir; that is a report by the District Engineer of the Forestry Service to the Commission on certain measurements made on the stream flow on the Klamath River.

Q. Where is the Klamath River?

A. It is in the northern part of California and the southern part of Oregon.

Q. Did the Commission receive that letter?
A. It received the letter May 7, 1927.
Q. Did it know the contents of that letter?
A. Yes, sir.

By Mr. JACKSON. We move to strike the answer that the Commission knew of the contents of the letter.

By Mr. THOMPSON:

Q. Do you know of your own knowledge that it did?
A. Yes, sir.

(Exhibit 104, being a letter dated December 15, 1925, from O. C. Merrill to Kramer, and Exhibit 105, being a letter dated May 2, 1927, from F. E. Bonner to O. C. Merrill, offered in evidence.)

Q. I hand you a number of photostatic pages, marked for identification Government's Exhibit No. 106 and described as "Memorandum re Declaration of Intention of the New River Development Company, before the Federal Power Commission—Statement of the Case," and signed by Curtis, Mallet-Prevost, Colt and Mosle, and I ask if you know what that is. [Handing paper to witness.]

A. It is a brief by the—or an argument by the attorneys for the declarant on the subject of the proposed—the Commis-
749 sion's proposed action on their Declaration of Intention, of the New River Development Company, and it is accompanied by a supplement from the same source.

Q. Setting forth the position of the applicants?
A. Of the Declarant.

(Exhibit 106 offered in evidence.)

By Mr. THOMPSON:

Q. Here is the first sheet?
A. (Continuing.) October 24, 1925—It is entered in handwriting, and I think it to be received that day.
Q. The reason for that is that the stamp of the Commission is illegible?
750 A. Yes, sir; it is illegible.

By Mr. THOMPSON. We offer the Government's Exhibit 106 in evidence. Do you object to it (addressing opposite counsel).

By Mr. JACKSON. We make our usual objection; yes, sir.

(At this point, at the suggestion of Mr. Horn, of defense counsel, Mr. Horn and Mr. Thompson conferred, after which Mr. Thompson stated that Exhibit 106 for the Government would be filed in evidence in four parts, namely, Exhibit 106, Exhibit 106-A, Exhibit 106-B, Exhibit 106-C.)

By Mr. THOMPSON:

Q. You have identified these papers dated October 23, 1925, addressed to Mr. Micou, and signed by Mr. Bevan?

(Exhibit 106, 106A, 106B, and 106C offered in evidence.)

By Mr. THOMPSON:

Q. Please state what effect, if any, the construction and operation of this Radford project, as described in the Declaration of Intention and the application for a license, will have upon the flow of New River.

A. It will have several probable effects. It would, if the projects were operated in a normal manner for such a project, it would create variations in the flow, depending upon the load that the powerhouse was carrying from time to time. By seasonal storage, it would also tend to decrease the highest flows over a substantial period and to increase the lowest flows, assuming that the project were operated as a hydroelectric project would ordinarily be operated. If the operator should elect to fill the reservoir at periods of low flow, they might decrease the flow below the dam to almost nothing. There are other
751 methods of operation in between, which would produce somewhat different effects, but, generally, I think, the effect—the effects would be as indicated in my answer.

By Mr. JACKSON. We move to strike the answer as not responsive. The question was if the project were constructed and operated in accordance with the Declaration of Intention, and the witness's answer is entirely in disregard of the Declaration of Intention, and is involved in a hypothesis.

By Mr. THOMPSON:

Q. Mr. Edgerton, what is the amount of water necessary for capacity production at the Radford project, according to this set-up in the Declaration of Intention?

A. As a matter of memory, I think about eight thousand cubic feet per second.

Q. How long would the reservoir——

By Mr. THOMPSON:

Q. Do you know what the average flow of New River at the project is?

A. No, sir.

Q. Do you know how long they could run that project during the day, if they ran it at capacity, taking nine thousand second feet of water?

By Mr. JACKSON. We object to that, because he said he did not know what the natural flow was at the dam site, and could not tell how long—he could not possibly tell how they could run, without knowing that.

A. It would be a matter of some days at low flow.

By the COURT:

Q. (Addressing the witness:) What did you say?

A. A matter of some days at low flow; they could run the plant and deplete the reservoir.

By Mr. THOMPSON:

Q. What effect, if any, would the operation of this project, as a peak-load project, have on the flow of the stream in the Kanawha River?

A. It would fluctuate the flow of water in the Kanawha River.

Q. In what way—to what effect?

A. It would tend to increase it over the stage[5] which you would expect naturally, at certain periods, and decrease it at other periods.

By the COURT:

Q. Do you know what the storage capacity behind the dam is?

A. I don't remember exactly.

752 Cross-examination by Mr. JACKSON:

Q. Colonel, I direct your attention to the third sheet, marked "page 117 of the Sixth Annual Report," appearing in Plaintiff's Exhibit 91, and particularly these sentences: "The meeting was devoted in part to a public hearing on the Declaration of Intention of the New River Development Company to construct a power project in New River about seven miles above East Radford, Virginia," and ask you whether that does not correctly state the fact in that regard?

A. Yes; it does state the fact.

Q. And I am right in understanding that that was a public hearing, held pursuant to formal notice given by the Federal power Commission; is that right?

A. I think so.

Q. And did you attend that public hearing, Colonel?

A. Yes, sir.

Q. And did the members of the Commission attend that hearing?

A. Yes, sir.

Q. Is the report of that hearing included in any of the Commission's reports or documents which you have introduced here in evidence this afternoon?

A. The stenographic report was presented here.

Q. This afternoon?

A. Yes, sir.

[5] See page 543 of Redirect.

Q. You don't remember the exhibit number, do you? It is number 100. Will you read the first two paragraphs of the second sheet of that exhibit, marked 13–C, at the beginning of the hearing?

A. "Washington, D. C., Tuesday, March 2, 1926. A hearing was held by the Federal Power Commission in the office of the Secretary of War relative to the Declaration of Intention
753 under the Federal Water Power Act, filed by the New River Development Company, affecting the New River in Virginia. Present: Honorable Dwight F. Davis, Secretary of War; Honorable Hubert Work, Secretary of the Interior; Honorable W. M. Jardine, Secretary of Agriculture, and Honorable O. C. Merrill, Executive Secretary of the Commission."

Q. You were present, however, as I understand it, although your appearance was not entered?

A. Yes.

Q. Will you please turn to page 5, according to my numbering of this Exhibit 100, and I read to you from page 5 as follows: "A rehearing was requested on the question of the jurisdiction of the United States over nonnavigable streams and a further investigation and report was made by the Chief of Engineers of the War Department. I should like to read that report. It is dated December 29, 1925, and is as follows:"—and then follows a report covering the next—

By Mr. JACKSON:

Q. I ask you whether you can identify that report which appears in Exhibit 100 at pages 5 to 15, according to my number?

A. I believe that is a report submitted by the Chief of Engineers to the Federal Power Commission in reconsideration of his original report on the Declaration of Intention of the New River Development Company and that it was subsequently withdrawn by the Chief of Engineers.

Q. Did you understand me to ask you whether it was subsequently withdrawn by the Chief of Engineers?

A. No, sir; I didn't.

Q. Why did you volunteer that statement?

A. As a contribution to the information about the identification of the report.

Q. Turning to page 13, I read you the following: "I therefore conclude that New River is not at the present
754 time a navigable water of the United States within the meaning of the Constitution and laws of the Congress, including section 3 of the Federal Power Act." Is that a correct reading of that part of the Taylor report as it was read before the Committee or the Commission at this hearing of March 2, 1926?

A. I have no reason to doubt it.

Q. I ask you to turn to page 15 and I direct your attention to the paragraph there reading: "Therefore, so far as can be predicted from available data and records, it would not be possible to operate the proposed project so as to adversely affect navigation on the Kanawha River under the exitsing project." Was that statement read into the transcript at the hearing before the Federal Power Commission on March 2, 1926?

A. I have no reason to doubt that it was. The record so indicates.

Q. And I read you the next paragraph as follows: "I therefore report that, in my opinion, New River in its present condition is not a navigable stream, that navigation on the Kanawha River will not be adversely affected by the proposed power development," and ask you whether or not that statement was read into the record before the Commission at the hearing of March 2, 1926?

A. I believe it was.

Q. And those excerpts which I have read to you were from the report of Gen. Taylor, Chief of Engineers, dated December 29, 1925, were they not?

A. I think they were.

Q. You have no doubt of that?

A. I have no doubt of it.

Q. And those excerpts and the entire report of Gen. Taylor as Chief of Engineers, under date of December 29, 1925,
735 was read into the record before the Federal Power Commission at this hearing of March 2, 1926, was it not?

A. It so appears. I believe it was.

Q. You do not doubt that?

A. No.

Q. I now direct your attention to the page marked both 13 and 32 of Plaintiff's Exhibit No. 100, and read to you the following, about the middle of the page: "May I submit then that the matter must necessarily be concluded unless there be some countervailing evidence, of which I have heard none. If there be anybody to question that finding we would like to hear it," and ask you whether you recall that that referred to the finding of Gen. Taylor, Chief of Engineers?

A. No, sir; I don't recall that it did.

Q. I direct your attention to the paragraph immediately preceding it which reads—Gen. Taylor, Chief of Engineers, Major General of the United States Army: "Therefore, so far as can be predicted from available data and records, it would not be possible to operate the proposed project so as to adversely affect navigation on the Kanawha River under the existing project,"

and ask you whether you now can say that the finding referred to in the paragraph read you in the previous question was the finding of Gen. Taylor?

A. My reluctance to answer was merely that I thought you asked me to recollect that these incidents took place. I naturally can't recollect these incidents. The record here indicates that they did and I think they did.

By Mr. JACKSON:

Q. You have no doubt of it?

A. I have no doubt of it, but the reason for my reluctance was that I thought I was being asked to recollect these incidents.

Q. You do recall at this hearing of March 2nd, 1926, the report of General Taylor as Chief of Engineers, dated December 29, 1925, was brought to the attention of the members of the Federal Power Commission, do you not?

756 A. I don't recall it as a matter of memory.

Q. Exhibit 100 shows that among those present were Hon. Dwight F. Davis, Secretary of War, Hon. Hubert Work, Secretary of the Interior, and Hon. W. M. Jardine, Secretary of Agriculture. They were the members of the Commission?

A. Yes.

Q. I understood you to testify, Col. Edgerton, in reference to Exhibit 91, that you remembered that at this 77th meeting, held in the office of the Secretary of War, March 2, 1926, there were present all of the members of the Commission as shown in this report?

A. I testified that supporting my memory by the record of the minutes.

Q. You undertook to verify the minutes, I understood, and say they were correct. Was I wrong about that?

A. The minutes are correct. They were verified by me shortly after they were prepared, or before they were prepared and I can't state except as the record shows, the record in which I have confidence, the attendance of so and so at any of these meetings.

Q. Then am I to understand as to all of your testimony about these various meetings of the Federal Power Commission in Plaintiff's Exhibit 91, you have no independent recollection but have testified merely upon the basis of your confidence in the minutes as they were prepared?

A. That is right, sir.

Q. I want to direct your attention to page 41 of Plaintiff's Exhibit 100, reading as follows: "Mr. Scott"—and the first part of this transcript shows that Mr. Scott was an attorney for the New River Development Company, the declarant—

"Mr. SCOTT. We have recited the report of the army officer having that duty and if that report is to be questioned we would like to be heard on that.

757 "Secretary DAVIS. I do not think that will be necessary.

"Secretary WORK. Is there anybody here to speak on the other side?

"Secretary DAVIS. Yes; we would like to know if there is anybody here to speak on the other side.

"Mr. SCOTT. I have not heard of anybody." You don't doubt the correctness of that report?

A. No; I do not. I think that is correct.

Q. I also direct your attention to page 44 and read to you the following statement of Mr. Scott: "If this Commission does not desire to hear any evidence, and I imagine not, that is all we have to say.

"Secretary DAVIS. I thank you very much, gentlemen, and we will give the matter consideration." Do you have any doubt that that is a correct report?

A. No; I have not doubt.

Q. I also want to direct your attention to the following statement at pages 40 and 41 of Complainant's Exhibit 100, beginning one line above the bottom of the page:

"Secretary DAVIS. Does that conclude the hearing?

"Mr. SCOTT. Mr. Chairman, I would like to raise a point of inquiry as to your procedure. The question before the Commission, as I have indicated, as I understand it, is one of fact. The fact has been investigated and reported upon by the Chief of Engineers of the Army, the officer of the Government intrusted with this inquiry. I want to ask if the Commission wants to hear testimony in support of that report or whether it will hear testimony against it, so that we may know how to proceed," and I ask you whether you doubt the correctness of that report?

A. I do not, sir.

Q. Do you have any doubt that this Plaintiff's Ex-

758 hibit 100 is a full, true, and complete report of the entire proceedings had at the public hearing before the Federal Power Commission on March 2nd, 1926?

A. No, sir; I have no reason to doubt that it is.

Q. And I have searched that very carefully and find no evidence offered at that time except——

Q. Col. Edgerton, you have already stated that there appears in the record of this public hearing before the Federal Power Commission on March 2nd, 1926, at pages 5 to 15 of Exhibit 100, the report of the Chief of Engineers, General Taylor, for December 29, 1925. That is right, isn't it?

A. Yes, sir; that is right.

Q. From your examination of the transcript of that public hearing on March 2nd, 1926, can you say whether there is any other evidence in that transcript before the Commission?

A. Yes; there is other evidence in the transcript.

Q. Will you point it out?

A. On page 13 appears to be evidence by the speaker that the Kanawha River is formed by the conjunction of the——

Q. Will you read that?

A. "I might say here that the Kanawha River is formed by the junction of the Gauley River with the New River. The head of navigation of the Kanawha River is about six miles below that junction"—which doesn't seem to be a part of the quotation.

Q. Is there any other evidence offered and received before the Commission in that transcript besides what you have just read and General Taylor's report?

A. Well, sir; I don't know whether there is or not. I thought there was much more evidence than there is.

Q. If there is any other evidence you are not able to point it out, are you, Colonel?

A. Well, not quickly.

759 Q. I don't think you will find it. If you find any more, read it.

A. Shall I go right ahead?

Q. If it will only take a minute.

A. As evidence of the Commission's action or statement of the Commission's action, on page 29. I think it is rather trifling of me to point out these things that I think are evidence, isn't it?

Q. Is there anything that you find in there or that you know of in that hearing that contradicts the report of General Taylor, in that transcript?

A. I don't find anything that contradicts that report in this transcript.

Q. Do you know of any other public hearing that was ever held by the Federal Power Commission upon the Declaration of Intention filed by the New River Development Company for the construction of the project at Radford prior to the finding of June 1st, 1927?

A. No, sir; I don't know of any other.

Q. You would know of it if there had been another public hearing held, wouldn't you?

A. I think so.

Q. I read you from Plaintiff's Exhibit 91, page 138 of the Sixth Annual Report of the Federal Power Commission, as follows: "The Commission after discussion directed that the case, with additional data collected, be returned to the Chief of Engineers for further consideration." Does that correctly state the action taken by the Commission in that regard?

A. Yes, sir.

Q. And at that time did the Commission send back all of the pertinent papers in the case, together with the reports of the Chief of Engineers, to the Chief for that consideration, if you know?

760 A. I don't know.

Q. You said something about the report of General Taylor dated December 29, 1925, being returned to him. Have you the letter of transmittal with which it was returned?

A. No, sir.

Q. Do you know anything about that?

A. No, sir.

Q. You don't know how it was returned?

A. No, sir.

Mr. JACKSON. At this point I would like to have this matter clearly understood. Yesterday the line of testimony of this witness very largely had to do with offering in evidence documents and exhibits said to have been before the Federal Power Commission at or prior to the finding of June 1st, 1927. We objected to that for the reasons stated. The court overruled the objection and allowed us an exception and, for convenience, I asked the court's leave that our objection might be understood to run to that entire line of testimony with the same ruling of the court and exception allowed. It is not entirely clear in the record, and while it is fresh in the minds of the court and counsel, I wonder if it may not be understood that that is the situation as to the reception of that evidence.

The COURT. Yes.

Mr. JACKSON. And the further point that it was received by the court for the purpose of showing what was before the Commission and not as probative of the issues to be determined by the court in this case.

The COURT. That is right.

By Mr. JACKSON:

Q. Colonel, at the close of the session yesterday I had asked you a question or two about General Taylor's report of December 29, 1925, which was, I think, Exhibit 97. Was there a duplicate copy of this report of General Taylor in the files of the Federal Power Commission at all times up to the making of the finding of June 1st, 1927?

A. So far as I know there was.

Q. And that was a duplicate copy that was received at the Federal Power Commission offices with the original?

Q. (The question was read.)

A. I think it was.

By Mr. JACKSON:

Q. Col. Edgerton, you testified yesterday about a number of documents which you said were before the Federal Power Commission prior to its finding of June 1st, 1927. By that I take it you mean that those documents had been received at the offices of the Federal Power Commission before that date?

A. Yes, sir.

Q. And those documents were severally in the files of the Federal Power Commission?

A. Yes, sir.

Q. And that you, or perhaps some other officer or employee of the Commission, had, to the best of your judgment and belief, seen all of those documents prior to the finding of June 1, 1927?

A. Yes, sir.

Q. And I don't suppose you intended to convey to the
761 court the impression that Secretary Jardine and Secretary Davis and Secretary Work individually examined and read those documents?

A. I didn't intend to discriminate. Some they did and some they didn't.

Q. You don't now, I assume, purport to have any independent recollection as to which of those documents any of those gentlemen saw and read?

A. Not a complete recollection. I know some documents that they saw and some I wouldn't know and some I know they didn't see.

Q. Some of those that you have mentioned here yesterday and which were offered in evidence you know that the Commission members did not see; is that true?

A. I don't recall any that were mentioned in this list that I could be sure they did not see.

Q. You couldn't be sure that they did see all that were mentioned?

A. No; I wouldn't be sure.

Q. And, of course, you couldn't be sure as to which members of the Commission saw any particular document, could you?

A. No, sir.

Q. Col. Edgerton, were these documents which you identified yesterday as having been received at the offices of the Federal Power Commission selected from the files of the Federal Power Commission by you?

A. No, sir.

Q. Who did select them, if you know?

A. I don't know.

Q. Then is it fair to say that a list of these documents was submitted to you and you were asked to identify them as having been

received at the offices of the Federal Power Commission before the finding of June 1, 1927?

762 A. I recognized all the documents that were presented here as having been received.

Q. That isn't quite the question. [The question was read.]

A. No, sir; no list was submitted to me.

Q. Well, particular documents were submitted to you and you were asked to identify them; is that right?

A. I was only asked to identify them here in the courtroom. I was shown numerous documents and my attention was invited to records in the Commission's office and I read them over within the last few weeks to refresh my mind for the purpose of testifying here.

Q. The point I am getting at is that the documents which you identified here are documents that were selected by some one else and submitted to you to see whether you could identify them?

A. That is right.

Q. And you don't mean to testify here that the documents which you have identified as having been received at the offices of the Federal Power Commission before the finding of June 1, 1927, were all of the documents received at that office before that time which in any way touched the Declaration of Intention of the New River Development Company?

A. No, sir; they were not all of the documents.

Q. There were a good many other documents received at the offices touching this Declaration of Intention which are not included in the list which you have identified here in court, were there not?

A. Yes, sir.

Q. And do you know why these particular documents were selected?

A. No, sir.

Q. That is something you had nothing to do with?

A. That is right.

763 Q. Do you remember that on or about October 16, 1925, the then Chief Counsel of the Commission, Judge Call, rendered a report, or opinion, to the Executive Secretary advising that there should be no attempt to assume jurisdiction on the ground of navigability?

A. No, sir.

By Mr. JACKSON:

Q. Was not that opinion laid before the Commission?

A. I don't know.

Q. You don't know about that?

A. No, sir.

By Mr. JACKSON:

Q. Col. Edgerton, I show you a document that was offered with your testimony as plaintiff's Exhibit 94, being the letter from Major Trippe and a memorandum to you. Are you willing to testify that that letter and memorandum were submitted personally to the members of the Commission?

A. No, sir; I don't know whether it was or not.

Q. As a matter of fact, the Commission didn't spend much time reading letters and memoranda received at the offices of the Commission, did it, at that time?

A. Not very much.

Q. Col. Edgerton, do you remember that on or about December 29, 1925, there was a Mr. Davenport on the staff of the Federal Power Commission as an engineer?

A. Yes, sir.

Q. Was he connected with the United States Geological Survey?

A. Yes, sir; he was an employee drawn from the Geological Survey to serve on the Commission's staff.

Q. Do you remember that on or about December 29, 1925, Mr. Davenport prepared a report to the effect that the proposed data on fluctuations of flow at the Pitt River were inapplicable to the proposed project on the New River?

By the COURT:

Q. Did you ever know of any such report as that?

764 A. I hadn't answered yet. Shall I answer now?

Q. Yes.

A. I don't know of any such report.

By Mr. JACKSON:

Q. Do you recall any report by Mr. Davenport at that time?

A. I recall distinctly that he made several memoranda.

By Mr. JACKSON:

Q. Do your know, Col. Edgerton, whether any report about December 29, 1925, by Mr. Davenport, went before the Commission?

A. I believe not.

Q. You don't know, you mean?

A. I believe not.

By Mr. JACKSON:

Q. I believe you said that you had verified the minutes of March 2, 1926, which appear on the second sheet of plaintiff's Exhibit No. 91; is that right?

A. Yes, sir.

Q. At page 117 it says, "The meeting was devoted in part to a public hearing under Declaration of the New River Develop-

ment Company to construct a power project on New River about 7 miles above East Radford, Virginia. Attorneys for the declarant were heard by the Commission in appeal from the tentative conclusion of the Executive Secretary that the project would affect the interests of interstate or foreign commerce." What did you mean by an appeal from the Executive Secretary?

A. The Executive Secretary notified the declarant that it was his intention to recommend to the Commission that it find that the interests of interstate or foreign commerce would be affected by this project.

Q. Was it the practice at that time for the Executive Secretary to consider declarations of intention and prepare decisions and then his decision would simply be submitted to the Commission?

A. It was the practice for him to make recommendations to the Commission as to the position they should take in all matters.

765 Q. Isn't it a fact that he made that recommendation on his own examination and that the Commission had nothing to do with the consideration of the Declarations of Intention excepting in a purely formal way until he submitted a recommendation?

A. Only by a personal conversation with the Executive Secretary and the Commission's staff did the members of the Commission participate prior to the formulation of the Executive Secretary's recommendation.

Q. That is, there might be informal conversations between members of the Commission and the Executive Secretary or possibly some member of the staff such as yourself?

A. That is right.

Q. Beyond that the Commission had nothing to do with the case until it was submitted formally to them in the form of a recommendation of the Executive Secretary at some regular meeting of the Commission?

A. I would say the members of the Commission took no formal part in any proceedings.

Q. There was no formal meeting of the Commission to receive or consider evidence or anything of that character and the only way that the matter came formally and, you might say, officially before the Commission was when it was submitted to them at some regular meeting by the Executive Secretary?

A. Yes, sir.

Q. That was the practice that was followed at the time when you were with the Commission?

A. That was the practice.

Q. Will you turn to the 7th Annual Report of the Federal Power Commission or rather to the sheets from that report which

ppear in Plaintiff's Exhibit 91, and especially pages 113 to 114
nd tell me whether that is the formal recommendation of the
xecutive Secretary in the New River Development Company case
the form in which it was brought before the Commission for
formal consideration?

A. It is very near the form in which it was brought before the Commission. It probably received some odification at the instance of the Commission or other members the Commission's staff at the time of the meeting.

Q. The document that was submitted to the members of the ommission at this meeting was this report of the Executive ecretary; is that true?

A. Yes.

Q. And that was all that was examined by the members of e Commission at the meeting, was it not?

A. I couldn't be sure about that.

Q. Wouldn't that be your best recollection, Col. Edgerton?

A. No, sir, I couldn't say about that.

Q. As a matter of fact, were not the minutes of the meetings the Federal Power Commission at that time drafted by the xecutive Secretary and/or yourself prior to the time when the eetings were held?

A. Yes, sir; a draft of proposed recommendations and the roposed findings was submitted at the meetings and were ecked over by the members of the Commission, modified if they w fit in the light of informal discussion and examination of ch documents as were brought into the Commission room that ey wanted to see.

Q. If there were any?

A. If there were any.

Q. Frequently there were none; isn't that so?

A. No, I think there were always some.

Q. You do?

A. Yes, sir, and then they were returned to the Executive ecretary or to me and rechecked again by all the members of e staff, written in final form and certified and furnished embers of the Commission.

Q. And when you rechecked the minutes, you rechecked them gainst the draft you had prepared before the meeting was held, didn't you?

A. Yes, and against——

Q. To see that the Commission had made no mistake?

A. And against the informal draft—I mean against the informal notes which were made by the Executive Secretary or yself of the changes desired by the Commission.

Q. And isn't the explanation of how Mr. Thompson expected you to check the minutes of the meeting of March 26, 1926, which you did not attend that you had drafted the minutes of that meeting, at least in relation to New River Development Company, before the meeting was ever held?

A. They were drafted before the meeting was ever held.

Q. And what you were going to do after the meeting was to compare the minutes as finally put in final form for the record and see whether they conformed to the draft that had been made before the meeting?

A. Well, and to see also whether they conformed with modifications directed by the Commission.

Q. You couldn't tell that, could you, Colonel, if you didn't attend the meeting?

A. Well, somebody attended the meeting and recorded the changes or the modifications that they desired made. If I didn't attend, my Assistant Chief Engineer attended and the heads of the other divisions. As a rule there were two or three copies of the minutes with the notes showing modifications that had to be made.

Q. You identified and vouched for the accuracy of the minutes of the meeting of June 1, 1927, at which was made the finding that has been under discussion in this case. Were those minutes drafted in advance of holding the meeting?

A. Yes, sir.

Q. And were there any changes made in them by the Commission during the meeting?

A. I don't know, sir.

768 Q. Yesterday you identified as Plaintiff's Exhibit #105, what purports to be a report of Mr. Kramer, Civil Engineer, in regard to some alleged fluctuations in flow on the Klamath River. Will you look at that and tell me if I am right in understanding it was received by the Commission on May 7, 1927?

A. Yes, sir.

Q. I produce here a document consisting of photostat of four sheets of paper, bearing a title at the top "E-Di- Virginia—May 9, 1927, New River Development Company, Record for Minutes," and ask to have it marked Defendant's Exhibit #505 for identification? [Exhibit was so marked.]

I show you Defendant's Exhibit #505 marked for identification, and ask you if that was a draft of the minutes of the meeting of the Federal Power Commission, held June 1, 1927, so far as that meeting related to a Declaration of Intention of the New River Development Company?

A. It appears to be a draft prepared for submission to the Commission as the record of the action to be taken.

Q. Can you tell from the initials on it whether it is true that draft was prepared by you?

A. Dictated by me, according to the initials.

Q. You have no doubt about that?

A. No, sir.

Q. You have no doubt it was prepared May 9, 1927?

A. I don't doubt that.

Q. And on the second sheet it appears in pen "O. K.—O. P. M., 5-11-27." Am I right that means, O. K. by Mr. Merrill, Executive Secretary, May 11, 1927?

A. Whenever the date shows.

Q. And is it not a fact that these minutes drafted by you May 9, 1927, are substantially, if not identically, the same as the minutes of the meeting of June 1, 1927, appearing on page
769 113 and 114 of the 7th Annual Report of the Federal Power Commission for the year ended June 30, 1927, which you offered in evidence as a part of Plaintiff's Exhibit No. 91?

Q. At your leisure, when you have left the stand, will you examine it, and see if you find any discrepancy in the draft of May 9, 1927, and the actual minutes as you offered them in evidence, for June 1, 1927, will you advise me?

Q. I have here a copy of the 7th Annual Report of the Federal Power Commission, 1927, which I will ask to have marked for identification as Defendant's Exhibit #506. [Exhibit was so marked.] Col. Edgerton, I show you pages 111 and 141 of Defendant's Exhibit #506, for identification, and ask you whether that is the complete minutes of the meeting of the Federal Power Commission held on June 1, 1927, or copy of them?

A. Yes; I think it is.

Q. And do I rightly understand or interpret these minutes as showing the meeting opened at 9:25 A. M.?

A. Yes, sir.

Q. And adjourned at 10:30 A. M.?

A. Yes, sir.

Q. And that during that interval in addition the Commission transacted all of the business disclosed by these thirty pages?

A. Yes, sir.

Q. Col. Edgerton, in your opinion, is it practicable to operate the project of the defendant at Radford without injuring navigation on the Kanawha River; physically feasible to do that?

A. Yes; it is physically feasible to do that.

770 Redirect examination by Mr. THOMPSON:

Q. Colonel, you have been testifying with respect to the manner of presentation of matters to be considered by the Commission at its meetings, and you have testified with regard to the

meeting of June 1, 1927. Please state whether or not it was the custom to send out to the members of the Commission, in advance of the meeting, the agendum, which was to be considered at the meeting.

A. It was.

Q. And you sent that out to them some days in advance?

A. As far in advance as practicable.

Q. So when the agendum was presented at the Commission the various members of the Commission had had that in their possession sometime?

A. Yes, sir.

Q. This agendum, who prepared that?

A. It was prepared in the original draft in the divisional offices principally concerned with the subject matter; for engineering matters, including Declarations of Intention, Applications for Permits and Licenses, the Engineering Division prepared the draft; for Accounting matters, the Accounting Division; and legal matters, the Legal Division, and when three or more elements were involved the draft was prepared jointly; one undertaking the basic draft and another modifying or adding to it, and it was then submitted to the Executive Secretary who made further changes, and that became the final draft, which was sent to members of the Commission in advance of the meeting, and at the meeting they produced these drafts, and any questions or comments they cared to make were made informally off the record, and incorporated in the record as it had been drafted so far, and upon the completion, these papers were referred to the original division preparing them, and
771 by them fixed in final form, representing the action finally taken, and they were then certified by the Executive Secretary and placed in the record, and copies sent to the members of the Commission, and excerpt copies made and sent to all outside parties of interest, covering matters of their interest.

Q. So on June 1, 1927, when you state that that document or the record therefor that meeting was reviewed by you, can you state of your own knowledge that was an accurate statement of what occurred at that meeting?

A. Yes, sir; that was an accurate statement of the substance of the meeting. Many off the record comments undoubtedly at all meetings, statements of views by members of the Commission, and sometimes explanations by members of the staff who were present, and in many cases very little. Most of the transmission line cases and land cases were thoroughly thought out by experts and the Commission seldom had anything to say about them, they accepted the record as prepared; but in the more important cases they often had information from personal sources not known to the Com-

mission; each Secretary dealt of course freely with the staff of his department, and often produced comments that represented the views of some Bureau of his Department that had not been communicated to the staff.

Q. Please state if you made any studies in your department and other divisions covering the subject of this New River project.

A. We have made many studies for the Commission as a whole and individually, and for the preparation of these records, which became the official record of the Commission's action.

Q. You have testified to the reception of the report of August 20, 1925, from the Chief of Engineers, General Taylor. I would like to ask you whom, if you know, asked for a reconsideration of that report?

A. The declarent asked for a reconsideration of it.

Q. I call your attention to Government Exhibit No. 91, page 135, which is a part of the minutes of the meeting of the 78th meeting held March 26, 1926, and ask you to read the last

772 paragraph, beginning with the word "proceeding."

A. (Reading.) Proceeding to a consideration of the reports and facts in the case which bear upon the question of the effect of the proposed power development upon navigation: In his first report of August 20, 1925, the Chief of Engineers said:

"This river is one of the principal tributaries of the Kanawha River, which has been improved for about 90 miles by the construction of 10 locks. It is really the Kanawha River under another name, and the flow if not properly regulated could have an adverse effect on navigation during low-water stages in the Kanawha River. * * *.

"To fully protect the interests of interstate or foreign commerce any license granted should be made subject to the following conditions:

"1. That the licensee shall permit a continuous flow past its dam not less than the low-water flow of the stream as determined by the records of the stream-gauging stations required by the preliminary permit, subject to such modifications as the Secretary of War may prescribe in the interests of navigation, and shall not at any time interfere with the natural flow of the river to such an extent as to interfere with or impede navigation.

"2. That the operations of the licensee, insofar as they effect the use, storage, and discharge of the river, shall be controlled by such reasonable rules and regulations as the Secretary of War may prescribe in the interests of navigation."

Q. I would like to ask you if that particular part you have just read was presented to the Federal Power Commission?

A. Yes, sir.

Q. And I would like to ask you also whether you
773 agreed with the statement, which reads as follows:

"To fully protect the interests of interstate or foreign commerce any license granted should be made subject to the following conditions:

"1. That the licensee shall permit a continuous flow past its dam not less than the low-water flow of the stream as determined by the records of the stream-gauging stations required by the preliminary permit, subject to such modifications as the Secretary of War may prescribe in the interests of navigation, and shall not at any time interfere with the natural flow of the river to such an extent as to interfere with or impede navigation."

Do you agree with that statement?

Q. State whether or not you advised the Commission favorably toward that proposal as set forth in the paragraph I just read.

A. I advised them to the same general effect.

Q. (Reading.) "That the operations of the licensee, in so far as they affect the use, storage, and discharge of the river shall be controlled by such reasonable rules and regulations as the Secretary of War may prescribe in the interests of navigation."

Did you recommend that proposal?

A. My recommendations were to the same general effect.

Q. I refer, and will come back to this exhibit I have read from, and read the paragraph counsel asked I read, as soon as I finish.

Q. I refer to Government Exhibit #92, and read from the 18th paragraph, being the report of the Chief of Engineers, General Taylor, of August 20, 1925:

"From the above facts it is established that New River has been under Federal improvement for navigation, that navigation has actually existed, and that the river was physically capable of interstate navigation although very light draft. The fact that navigation does not exist at present is not understood to change the legal status of the stream."

774 Do you know whether that part of the report of the Chief of Engineers was brought to the attention of the Commission?

A. Yes; the entire report was brought to the attention of the Commission.

Q. That report which I have just read was dated August 20, 1925. Now I believe you have testified that the reference back to the Chief of Engineers was made at the request of the Power Company, is that correct?

A. Yes, sir.

Q. And another report came from the Chief of Engineers December 29, 1925. Now I call your attention to next to the last

paragraph of that report, and ask you to read that statement. This is Exhibit #97.

"I therefore report that in my opinion New River in its present condition is not a navigable stream, and that navigation on the Kanawha will not be adversely affected by the proposed power development."

Q. Read the preceding paragraph?

A. (Reading.) "Therefore, so far as can be predicted from available data and records, it would not be possible to operate the proposed project so as to adversely effect navigation on the Kanawha River under the existing project."

Q. State whether or not when that report which I understand you testified was received by the Commission, it was accompanied with any other evidence or any new evidence other than in the report of August 20, 1925?

A. No, sir.

Q. I call your attention to Government Exhibit #91 and reading from page 113 of the meeting held June 1, 1927, I will ask you not to read it, but to look at the last two paragraphs with asterisks following, and then the quotation. You will note there is a reference there to the report of Gen. Deakyne, Acting Chief of Engineers, of July 23, 1926.

Q. At this hearing of March 2, 1926, did any other parties appear other than the applicant, Col. Edgerton?

775 (NOTE.—Strike out the last two lines of page 542.)

By Mr. JACKSON. We will concede that is the notice of the hearing of March 2, 1926.

(Referring to an exhibit Mr. Thompson had marked as No. 107.)

By Mr. THOMPSON. This is Government Exhibit #107 for identification, and we are offering it in evidence. It is a notice of the meeting to be held by the Commission, addressed to Mr. C. Bascom Slemp, dated February 20, 1926.

By Mr. JACKSON. It may be understood he was of counsel for the New River Development Company at that time?

By Mr. THOMPSON. Yes. I would like to read that.

(NOTE.—Whereupon Mr. Thompson read the following letter; Ex. 107.)

By Mr. JACKSON. We concede we had notice of the hearing of March 2, 1926.

By Mr. THOMPSON. May we have permission to substitute a copy, as that exhibit is an original in the files of the Commission, and we would like to have it back?

By the COURT. You may do that.

(NOTE.—Copy was filed with the record marked Exhibit #107 for the Government.)

Q. At this hearing of March 2, 1926, did any other parties appear other than the applicant, Col. Edgerton?

776 A. Yes, sir: there was some other parties present, representing the State of Virginia, as I recall it.

Q. Were they given an opportunity to be heard?

A. Yes, sir.

Q. Was it on the same matter?

A. Yes, sir.

Q. Yesterday on cross-examination counsel asked you to read a sentence from Government Exhibit #100, page 5. You did not read the preceding part of that sentence or paragraph, and I am going to ask you if you will read that, together with the part which you did read?

A. [Reading.] "Originally, the War Department in an investigation said that they could see no reason why jurisdiction should not be taken. A rehearing was requested on the question of the jurisdiction of the United States over nonnavigable streams; and a further investigation and report was made by the Chief of Engineers of the War Department.

By Mr. JACKSON. And then follows the report of General Taylor of December 29, 1925.

A. Yes, sir.

By Mr. THOMPSON:

Q. Col. Edgerton, I desire to call your attention to the stenographic report of your testimony given on yesterday, on direct examination, page 1627,* in the middle of the page, you were asked the following question:

"Q. In what way—to what effect?"

We were discussing the fluctuation of the flow of the water in the Kanawha River. Your answer was:

"A. It would tend to increase it over the state which you would expect naturally, at certain periods." The word "state" is a typographical error and it should be stage, should it not?

A. Stage, I think, should be the word.

By Mr. THOMPSON. If Your Honor please, I expect that I am going outside of the usual rule, but I am going to ask the Court to let me submit a question, which was submitted to Col. Edgerton on yesterday, on page 1622 of the record, and I want to ask him if he cares to amplify or change that answer. The question is as follows:

Q. Please state what effect, if any, the construction and operation of this Radford project as described in the Declaration of Intention, and the application for a license, will have upon the flow of New River?

* See page 519 of direct.

777 "A. It will have several probable effects. It would, if the projects were operated in a normal manner for such a project, it would create variations in the flow, depending upon the load that the powerhouse was carrying from time to time. By seasonal storage, it would also tend to decrease the highest flows, assuming that the project were operated as a hydroelectric project would ordinarily be operated. If the operator should elect to fill the reservoir at periods of low flow, they might decrease the flow below the dam to almost nothing. There are other methods of operation in between which would produce somewhat different effects, but, generally, I think, the effect—the effects would be as indicated in my answer."

Do you care to make any statement in regard to that answer?

A. I would be glad to elaborate further and state that the ordinary practice in the operation of a hydroelectric project of this kind is to operate it on a peak-load schedule at low-water flow, and in such an operation it would normally be shut down entirely for a portion of each day, and probably over a period of one or two days at the week ends, legal holidays, &c., when the system to which it was supplying current had a very light load Under such an operation the flow below the dam will be reduced to an insignificant one, when the plant was carrying no load and will be much greater than the natural flow would be at the same time when the plant was carrying a substantial load, or its peak load, and the result would be that the flow in the stream below would vary from very little, or nothing, to a maximum capacity of the wheels, and these variations would be transmitted downstream for a long ways affecting the flow, at least in theory, indefinitely, in distance down the stream.

Q. What effect would this have, if any, on flood-control conditions?

By Mr. JACKSON. I object to the question because it is not proper redirect examination.

By the COURT. No, it is not proper redirect, but I will permit it on the theory that it should have been brought out on direct but was omitted or overlooked.

By Mr. THOMPSON. Go ahead and answer the question.

778 A. The effect would be or rather during each period at a plant of this kind would likely be operated on a base load, would be to transmit the high flows through the reservoir as rapidly, or perhaps even more rapidly, depending on the physical characteristics of the reservoir than they would pass the same distance without the project. In the natural state, so that while the tendency would be to manifestly decrease for seasonal storage purposes the moderate floods, that same tendency could not be relied on for the extreme floods, which occur after a prolonged wet

period, and after the reservoir would be full. So that the effects that I refer to in decreasing the high flow was to generally affect flows of moderate height rather than extreme flood. Reliance can never be placed on a power reservoir for substantial flood protection in extreme floods.

By the COURT:

Q. Do you mean reliance cannot be placed on any dam that would be built?

A. On any reservoir built and operated for power purposes, because the reservoir, if operated intelligently, will be full, or may be full, or may be expected to be full, when the extreme flood comes along, so that when the extreme flood has passed through the reservoir, which it is likely to do more efficiently than it would pass through the natural channel.

Q. By "more efficiently," you mean faster?

A. I mean hydraulically more efficiently, yes; I mean faster.

I think that covers all the elaboration that is needed at this time. I could discuss the subject further if you wish me to.

Q. As to whether these dams in the rivers are being constructed with regard to flood control, or what is the difference in that?

A. A flood control reservoir should be emptied after each flood just as rapidly as possible, its entire storage capacity or
779 as much as possible to reduce the peak in ensuing floods which may occur at any time.

Q. There are no dams of that sort on the Kanawha River, or New River, are there?

A. Not that I know of; no, sir. A power reservoir, on the other hand, should be operated or be kept as full as possible consistent with supplying the electric load it is intended to accom-'odate.

780 Recross-examination by Mr. JACKSON:

Q. Col. Edgerton, when you said that if a power plant was operated on a peak-load basis, the flow below the dam might vary from almost nothing to a maximum hydraulic capacity of the installation, you were referring to the stream immediately below the dam site, I take it?

A. Yes, sir; before other tributaries enter.

Q. That, of course, would be modified by the tributaries to the stream among other things?

A. Yes, sir.

Q. Were you ever told by any officer of the Appalachian Electric Power Company what kind or scope of peak operation, if any, the company intended to follow? I mean the kind of operation they intended to follow?

A. No, sir.

Q. Col. Edgerton, do you know what is the peak load of the Appalachian Electric Power system?

A. No, sir.

Q. Do you know what time of day the Peak Load occurs?

A. No, sir.

Q. Do you know how the peak load is distributed among the generating stations of the Appalachian Electric Power system?

A. No, sir.

Q. Do you know how it would be distributed among the generating stations of this system two years from now?

A. No, sir.

Q. Do you know the duration of the peak of the Appalachian Electric Power System?

A. No, sir.

Q. Col. Edgerton, when the Chief of Engineers makes an official report to the Secretary of War, or some other agency of the Government, as his duty may require, does he transmit
781 with that report copies of evidence and data which he has examined and collected?

A. I think that depends on circumstances. Sometimes he does and sometimes he does not, it depends on the purpose the report is to serve.

Q. For instance, he would not transmit all the miscellaneous data and working memoranda that may have been accumulated in his office in working on a particular problem when he finally shaped his report to official form and transmitted it, for instance, to the Secretary of War, would he?

A. Ordinarily he would not do that except on request.

Q. So that there would be nothing unusual in a report of the Chief of Engineers not being accompanied by working memoranda and underlying data that may have been examined either by him or other engineering officers under his direction?

A. No, sir; there would be nothing unusual.

Q. And is it not a fact that in the Chief of Engineers Department there is frequently very voluminous information and data examined and collected in studies which are made to arrive at engineering answers to questions which come within the jurisdiction of the Engineering Department?

A. Yes, sir.

Q. Now is it not a fact that General Taylor's report, dated August 20, 1925, Government Exhibit 92, was not accompanied by any underlying data, which may have been collected or examined, or studied, if there was any in the office of Chief of Engineers?

A. I do not believe it was accompanied by any other material.

Q. The exhibit indicates no enclosures whatever, does it not?

A. No enclosures; no, sir.

Q. I now read to you from Plaintiff's Exhibit 97, being
782 General Taylor's second report, bearing data of December 29, 1925, this paragraph on the first page: "A careful study has been made of all the data presented by the declarant and a further study has been made of all available data and records bearing on the questions at issue which are available in this office, or which could be obtained from other Government Bureaus. The following report is the result of the additional studies which have been made and the additional information which has been obtained since the date of my previous report."

I will ask you whether you question the veracity of that statement of the Chief of Engineers in that report?

A. I did not.

Q. Col. Edgerton, I will ask you to turn to page 113 of the 7th Annual Report of the Federal Power Commission, for the fiscal year ended June 30, 1927, included in Plaintiff's Exhibit 91, and I will ask you whether pages 113 and 114 are not the minutes relative to the action of the Commission on the Declaration of Intention of the New River Development Company, which you have already testified you prepared prior to the meeting and subsequent to it. Is that true?

A. I have not made that check.

Q. I mean that subsequently you checked them as they appear in the report?

A. Yes, sir.

Q. In the second paragraph of those minutes, after paragraph No. 1, you refer to certain studies made upon Pit River in California, do you not?

A. Yes, sir.

Q. And then at the bottom of the page, after referring to these studies on the Pit River, you quote from the report of General Deaknye, acting Chief of Engineers, bearing date July 23rd, 1926.

783 A. That quotation is here; yes, sir.

Q. Then there are a number of asterisks indicating omissions. Is that right?

A. That is right.

Q. I now read to you from Plaintiff's Exhibit 96, the second paragraph, being numbered paragraph 2, of the report of General Deakyne, dated July 23, 1926, as follows:

"2. After having made a careful study of the data submitted I am of the opinion that due to the peculiar conditions existing in the Pit River as shown by the fact that there is practically no decrease in the height of the wave between its source at Pit #3 and Ydalpom, a distance of about 40 miles, the data do not give a true

picture of how a wave travels down a river. Further, due to the totally different character of the two rivers, considerable doubt is felt as to the possibility of computing wave attenuation in the New River from data obtained in the Pit and Sacramento Rivers even if sufficient data on the latter streams were available. In my judgment the only correct procedure will be to study the action of the waves produced by the intermittent operation of the present plant at Ivanhoe on the New River. Such a study has been started and will be continued until a satisfactory answer is obtained."

I will ask you whether that paragraph is one of two paragraphs which you omitted from this report and was replaced by asterisks?

A Yes, sir.

By Mr. THOMPSON:

Q. Please state what happened, if you know, after the receipt of General Deakyne's letter of July 23, 1926, with respect to stream flow studies?

A. I consulted the assistants to the Chief of Engineers and went over information that they had. We communicated with the District Engineer in the Forestry Service at San Francisco, with a
784 view of having further comment from his office, as to whether studies, if any could be found, that would bear upon these rather difficult technical problems. I communicated with a number of District Engineers of the War Department in an effort to secure information concerning their observation of like phenomena of streams under their jurisdiction. I assembled the replies and used them in formulating further studies that were made on the subject.

Q. And what were the further studies that were made?

A. There were a good many office studies made, and the matter was still under consideration when I left the Commission.

Q. Col. Edgerton, are you confining your statement to the time prior to June 1, 1927?

By Mr. THOMPSON. That is right.

Q. State whether or not the District Engineers of the Forestry Service made another survey of any river in California?

By Mr. JACKSON. I object to the competency of that question.

By the COURT. You mean which went before the Commission?

By Mr. THOMPSON. Yes, sir. We have already introduced exhibits yesterday in regard to that.

By Mr. JACKSON. They will speak for themselves and I renew my objection.

Objection overruled. Defendant excepts.

A. They made several studies as I recall it, the principal one of which was the one made on the Klamath River in northern California and southern Oregon.

Q. You testified as to Government Exhibit 105 on yesterday, I believe, it being a letter, or a report rather, of May 7th, 1927, addressed by Mr. Kramer, Hydraulic Engineer, U. S. Forest Service, San Francisco, California, did you not?

A. Yes, sir.

Q. And that is the report on the Klamath River, is it not?

A. Yes, sir; or observations.

Q. You testified on yesterday that that report was before the Commission on June 1st or before June 1st, 1927?

A. Yes, sir.

Q. Now, Col. Edgerton, you came immediately from the Chief of Engineers' office over to the office of Chief Engineer or Assistant Chief Engineer to the Federal Power Commission, didn't you?

A. No; my previous duties were at the command of the General Commander of the U. S. Army at Fort Leavenworth, Kansas.

785 Q. During the time this matter of the New River project was under consideration, did you have contact, or not, with the file of the Chief of Engineers office, or the District Engineers office?

By Mr. JACKSON. I object to the question. This is entirely new matter.

By the COURT. I think so. Of course, he can take the witness off the stand and bring him back later if he wants to.

By Mr. THOMPSON. I may be under a misapprehension, but I understood counsel to go into the question of what were in the files of the Chief Engineer's office, and whether he sent data over to the commission, or whether he had data which he did not send to the Commission, and this is simply following up that question, or those questions. I realize that I am, in a sense, violating one of the rules, but as Your Honor says, I can bring this witness back. I think counsel on the other side went beyond what I asked when he cross-examined the witness, but I did not say anything about it.

By Mr. JACKSON. I did not ask that question. I asked him about the general practice.

By Mr. THOMPSON. May I call Your Honor's attention to the fact that Mr. Jackson read from a letter dated December 29, 1925, being the second report of General Taylor, and he read this paragraph:

"A careful study has been made of all the data presented by the Declarant, and a further study has been made of all available data and records bearing on the questions at issue which are available in this office, or which could be obtained from other Government Bureaus."

By Mr. JACKSON. Will you please read it all?

By Mr. THOMPSON. "The following report is a result of the additional studies which have been made and the additional information which has been obtained since the date of my previous report."

My recollection of the testimony of this witness is that I asked him if there was any additional data that came over with the Report of the Chief of Engineers of December 29, 1925, and he stated that there was not. Counsel then, having read this paragraph, asked him if there was not prepared a great deal of other data in the office of the Chief of Engineers. My question goes to the fact, if it be a fact, that this witness was familiar with the office of the Chief of Engineers, was going back and forth to that office all the time, and I intended to ask if he was cognizant of what was in the file of the Chief of Engineers.

By Mr. JACKSON. I asked him if he doubted the veracity of that statement, and he said he did not. I do not know whether Mr. Thompson wants to impeach his own witness, and to prove that the statement is not true. If he has that purpose in mind, or if he is asking that question it must be to impeach his own witness, and it is not in response to anything we asked on cross-examination. I did not ask anything about what was sent over with the report of December 29, 1925.

By the COURT. I think he can go ahead.

By Mr. JACKSON. We desire to take an exception.

By Mr. THOMPSON:

Q. Were you familiar with the office of the Chief of Engineers?

A. Yes, sir.

Q. And with the files in the office of the Chief of Engineers?

A. I had frequent contact with the engineers and all records in the Chief of Engineers office, and conversation with the officers and other assistants who worked on such matters.

Q. With reference to this particular Radford project?

A. In regard to every project.

Q. Did you ever see any other evidence in the files in the office of the Chief of Engineers in support of this report?

By Mr. JACKSON. We object to this evidence. He cannot impeach this report by having the witness testify that he had conversations with other engineers. We do not know who they are, and apparently he is going to undertake to say what the Chief of Engineers, General Taylor, considered in making his study and in making his report. I do not think this evidence could possibly be admitted even if the witness were willing to say that.

By the COURT. Objection overruled. Defendant excepts.

By Mr. THOMPSON. Answer the question, please.

A. Could I have the question read again?

By Mr. THOMPSON:

(Question read.)

By Mr. JACKSON. May I ask a qualifying question of the witness?

By the COURT. Yes.

By Mr. JACKSON:

Q. Col. Edgerton, you are dealing with what period of time now?

A. I am dealing really with the entire period of time before I went on duty with the Federal Power Commission.

Q. And that was from when to when?

A. That was from June 1924 to August 1929.

Q. And during that time did you have charge of the files in the Chief of Engineers' office?

A. At no time did I have charge of the files in the office of the Chief of Engineers.

Q. Was it any part of your duties to keep the files and records in the office of the Chief of Engineers?

A. No, sir.

Q. Was it any part of your duties during that time to prepare the report of the Chief of Engineers?

A. No, sir.

786 Q. In the preparation of this report by the Chief of Engineers, the studies which he made, or had made, the things which he considered were no part of any official duty of yours, were they?

A. No, sir.

(Exhibit 108, being letter dated October 16, 1930, from Curtis, Mallet-Prevost, Colt & Mosle, to the Federal Power Commission, was offered in evidence.)

787 MRS. MINNIE LEE WARD

Direct examination by Mr. THOMPSON:

Q. Please give your name to the stenographer.

A. My name is Minnie Lee Ward.

Q. Where do you live?

A. In Washington, D. C.

Q. Please state to the Court whether or not you were ever in the employ of the Federal Water Power Commission.

A. I was.

Q. When did you go with the Federal Power Commission?

A. October 18th, 1920.

Q. Was that the beginning of the organization of the Commission?

A. That was approximately two months after the beginning of the organization. I think there were about twenty employees there when I went in there from the Forest Service.

Q. What period of time were you there?

A. Until 1930.

Q. What was your position?

A. My position was that of file clerk and assisting with the mails.

Q. Where was your office located?

A. In the new Interior Building.

Q. In Washington City?

A. Yes, sir.

Q. Please describe your duties as file clerk.

A. As file clerk, it was my duty to see that the files were kept in proper workable shape and file the correspondence chronologically, as well as make reports and memoranda and get papers to the persons asking for them with the least possible effort and charge out the material drawn to whom it would go and the date.

788 Q. Did you have anything to do with incoming mail?

A. All incoming mail passed over my desk, after the mail clerk put the Received Stamp on it, and then route it through the office concerned, and matters of routine went to the office concerned, and matters of policy went to the executive secretary and then to the several branches of the Commission concerned.

Q. What were contained in the files generally—was there a New River file?

A. There was a New River Development Company file for the declaration of intention.

Q. As file clerk, state whether or not you ever received a document, dated August 20, 1925, signed by Major General Taylor, and addressed to the Federal Power Commission, on the subject of the New River Development Company's declaration of intention?

A. Yes, sir.

Q. What did you do with that?

A. I sent it to the Executive Secretary and it went to the office of the engineer and eventually it came back to the file room and it was filed.

Q. What did it consist of?

A. It consisted of a report from Major Trippe, the District Engineer at Huntington, West Virginia, with a memorandum sending it from the Division Engineer to the Chief of Engineers, and then the Engineer's discussion and recommendations were put on it.

Q. State whether or not you received another document from General Taylor?

A. I did.

Q. What was the date of that document?

A. December 29th, 1925.

Q. Were you in charge of the files in that office all the time that you have described?

789 A. I was.

Q. I hand you Plaintiff's Exhibit No. 97, dated December 29th, 1925, addressed to the Executive Secretary and signed by Major-General Taylor, and ask you if this is the document to which you refer having been received?

A. Yes, sir; this is a copy of the duplicate copy. It is not a photostatic copy of the original, but of the duplicate copy.

Q. And when this came to you, was there an original?

A. There was.

Q. I hand you a yellow paper, marked for identification Government's Exhibit 109, dated April 15th, 1926, and with the initials below the statement there "M. L. W.", and I ask you if you know what that paper is?

A. Those are my initials and this is a charge sheet that I placed in the file—I placed in the file of the New River Development Company at the time General Taylor's report of December 29th, 1925, was withdrawn.

Q. What was the procedure in regard to documents taken from the files, when withdrawn, so far as identification as to where they went was concerned?

A. When any material was withdrawn from the file—would be removed, a record would be kept of it on one of these yellow sheets, stating what was removed, the date, and by whom, and upon the return of that material to the Federal Power Commission, that sheet was withdrawn and destroyed.

Q. Please read what it says on Exhibit 109.

By Mr. JACKSON. It has not been offered in evidence. Before you read it, you should offer it in evidence.

By Mr. THOMPSON. I will offer it.

By Mr. JACKSON. We object to the exhibit being read before it is offered in evidence.

By Mr. THOMPSON (Addressing the Court). Cannot I have it identified before I offer it?

By the COURT. Yes, sir.

By the WITNESS. Shall I read it?

By Mr. THOMPSON:

A. Yes, ma'am.

A. (Reading.) "April 15, 1926. Chief of Engineer's Report of 12-29-25, returned to General Taylor by Silas Cooke this after-

noon (3:40), upon telephone conversation with Mr. Merrill. M. L. W."

Q. Who is M. L. W.?

790 A. Myself.

Q. We offer that document in evidence.

By Mr. JACKSON. We object to it, because it is incompetent and it shows on its face that it is nothing more than hearsay about a report——

By the WITNESS. (Interrupting.) It is not hearsay. I made that charge slip.

By Mr. JACKSON. I will not argue that with you, Mrs. Ward.

By the COURT. The objection will be overruled.

By Mr. JACKSON. We except to the ruling of the Court.

By the COURT. All right, you may have your exception.

Q. What was the occasion of your having made this entry?

A. Mr. Merrill stated that General Taylor said——

By Mr. JACKSON. We object to the hearsay evidence.

By Mr. THOMPSON. Here is an entry made by the witness, she said she had control of the files, and when a paper was removed from the files, an entry was made, and she has read this entry, and we think it is part of the res gestae.

By Mr. JACKSON. We object to any conversation about it. We don't mind the entry, but we object to any conversation about it.

By the COURT. The objection will be overruled.

By the WITNESS. Mr. Merrill said that General Taylor wished to have the report of December 29th, 1925, returned to him and would he return it to him that afternoon by a messenger.

Q. And what did you do?

A. I removed the report from the file and prepared the charge sheet, and put the report in an envelope and I asked Silas Cooke to take it to General Taylor. It was addressed to General Taylor.

Q. Did you hand it to Silas Cooke?

A. Yes, sir.

Q. State whether or not, during the time that you were there, if that report ever came back to the Commission?

A. It did not.

By Mr. JACKSON. She would not know that. She only knows about the files.

By Mr. THOMPSON:

Q. She said that all the mail came to her, and that it did not come back?

A. It did not.

Q. If it had come back, would you have destroyed this Exhibit No. 109?

A. Yes, sir.

Cross-examination by Mr. JACKSON:

Q. Is a duplicate copy of Major General Taylor's report in the file?

A. The carbon copy was, but it was not official—it was not an official record of the Commission. They had no occasion to receive a duplicate copy and it came there because it was the procedure of the War Department.

791 Q. Did you understand me to ask you if it was an official record?

A. You can ask it again.

By Mr. JACKSON. We move to strike the last part of the answer as not responsive to the question.

Q. This copy was in the file, and we will not quarrel as to what kind it was?

A. It was, but it was an unsigned copy, I would like to say.

Q. Why would you like to say that?

A. Because it had no official significance; it was just a carbon of the original.

Q. What made you think it had no official significance?

A. Because it was my duty to know what came in and what was to be preserved in the files, and what could be destroyed or saved, and there might be occasions when we sent carbons out for information.

Q. Did you destroy the carbon in the file?

A. No, sir.

Q. Why did you have to know what was official in the files?

A. It was part of my duty.

Q. Who told you that? Whether it was official or not?

A. Because we have regulations as to what was to go in the files. All original material was, of course, official—they were the official copies.

Q. When did you leave the Commission?

A. March 25th, 1930.

Q. And this was received in 1925?

A. Yes, sir.

Q. Have you thought anything about it since it came in in 1925?

A. Occasionally; yes, sir.

Q. It has been a matter of considerable interest to you, has it?

A. I was interested because the New River Development Company was so very active. I was especially interested because General Taylor reversed himself on his report of August 20th, and I wondered what influence was brought to bear on him.

792 Q. You did not like the report of General Taylor, did you?

A. I did not care; it was not anything to me one way or another.

Q. It was nothing to you?

A. Not personally; no, sir.

Q. But you still kept it in mind ever since 1925?

A. It is in my subconscious mind; it has bubbled up occasionally in my mind.

Q. And you have talked about it quite a bit lately, have you?

A. No, sir; when the matter came up, however, I remembered about the file and I said, "Yes, I put a charge slip in the file," and I took a glance at the file to see if it was still there.

Q. Your name is Mrs. Ward?

A. Yes, sir.

Q. Is your husband an attorney in Washington?

A. Yes, sir.

Q. He is associated with Mr. Thompson, is he?

A. Only in certain cases.

Q. Frequently?

A. They have separate offices.

Q. Are they in the same building?

A. Yes, sir.

Q. Is there a door between them?

A. There are several of them, I think.

Redirect examination by Mr. THOMPSON:

Q. How many floors are between us?

A. Two.

Q. These rules and regulations were made by Mr. Baker when he was Chief of the Department, were they?

A. He assisted in making them; he was the First Chairman of the Commission.

793 Q. And you were an employee under Mr. Baker?

A. I was one of the lower downs under Mr. Baker.

Recross-examination by Mr. JACKSON:

Q. Where did the officials start on the Commission?

A. The Commissioners and the heads of the departments.

794 W. S. WINN

Direct examination by Mr. MCCLERNAN:

Q. Your name is W. S. Winn?

A. Yes, sir.

Q. What is your occupation?

A. I am a civil engineer.

Q. Where do you live?

A. Huntington, West Virginia.

Q. Are you in the employ of the Corps of Engineers of the United States Army?

A. Yes, sir.

Q. What are your duties at the Huntington office?

A. I have charge of the section called Studies and Reports Section, and under that comes hydraulic work.

Q. Tell us briefly what the nature of your work is.

A. I prepare reports on technical subjects and other subjects, and recently the most I have done has been on hydraulic subjects.

Q. Tell us what experience you have had in hydraulic work.

A. Well, I entered the Service of the Engineer Corps on river work in 1891—that is, 45 years ago. Since then, I have put in in aggregate service on river work more than 30 years. I was with the Alabama Power Company, developing hydroelectric power for eight years.

By Mr. JACKSON:

Q. When was that?

A. When I was with the Alabama Power Company?

795 Q. Yes, sir.

A. I was first with them in 1912 and 1913, and next from 1922 to 1929.

By Mr. McCLERNAN:

Q. During your work, you had occasion to work with the volumes of stream flow?

A. Oh, yes; very frequently.

By Mr. McCLERNAN:

Q. I hand you a paper marked for identification as Government's Exhibit No. 110. Do you recognize it?

A. Yes, sir.

Q. Where does it come from?

A. From the United States Engineers' office at Huntington, West Virginia.

Q. Is it an official record of that office?

A. Yes, sir.

Q. Did you use that record in your work?

A. Records like this; yes, sir; and this particular one I have used; yes, sir.

Q. Will you explain briefly what it is?

A. It is a record of the daily gauge readings at Lock No. 24, on the Ohio River.

Q. Where is Lock No. 24 with reference to the mouth of the Kanawha River?

A. It is the second lock above the mouth of the Kanawha.

Q. What use is made of that record in the District Engineer's office?

A. It was primarily made as a record of the navigation conditions on the river, but since then, we have had occasion to use it in making hydraulic studies.

Q. Is that record public, in the sense that anyone that wants a copy can get it, upon payment of the expense of it?

A. Yes, sir; we never hesitated to give it to anybody that asked for it.

(Exhibit 110 offered in evidence.)

796 By Mr. JACKSON:

Q. Is this published anywhere?

A. No, sir.

By Mr. MCCLERNAN:

Q. Is that record kept as part of the regular duty in the District Engineer's office at Huntington?

A. Yes, sir. I will qualify that statement——

By Mr. JACKSON. I don't know that we will want to object to this, but we want an opportunity to examine it, and if we see fit to do so, we wish an opportunity to make our objections later, if any.

By the COURT. Very well.

By Mr. MCCLERNAN. You have no objection to that, do you (indicating)?

By Mr. JACKSON. They are gauge readings——

By the COURT. It is the same sort of thing that we have had before.

By Mr. JACKSON. I don't know. It is the same information, but whether or not it is on the same basis, I don't know. We may make our objections later on.

By the WITNESS. I would like to qualify my answer about the publishing of those records. Daily certain readings of the gauge are telephoned down the line and finally find their way into the Weather Observer's office at Cincinnati and published daily in daily bulletins.

By Mr. JACKSON:

Q. They are not published in the official reports of the War Department?

A. No, sir.

By Mr. MCCLERNAN:

Q. I hand you Government's Exhibit No. 111. Do you recognize that?

A. Yes, sir.

Q. Is that another official record in the District Engineer's office?

A. Yes, sir; that is Lock 25, similar to the one you handed me just now.

Q. Where is Lock No. 25, with reference to the mouth of the Kanawha?

A. It is the first lock above the mouth of the Kanawha.

Q. Is this also a public record, in the sense that it is kept where anybody can get it—a copy of it?

A. Yes, sir.

Q. What use did you make of this record?

A. The same as 24.

Q. It is the same as Exhibit No. 110, except that it refers to a different lock on the Ohio River?

A. Yes, sir.

By Mr. McCLERNAN. We offer Exhibit No. 111 as an exhibit for the Government.

(The foregoing exhibit marked No. 111 for the Government is filed and made a part of this record.)

By Mr. JACKSON. We reserve the right to examine this later on and make our objections, if any.

By Mr. McCLERNAN. All right.

Q. I show you Government's Exhibit No. 112, consisting of four sheets. Do you recognize that?

797 A. Yes, sir.

Q. Do you know where it came from?

A. It came from the Engineer's office at Huntington.

Q. Is that an original record?

A. No, sir; it is copied from the original.

Q. Do you know whether or not that copy is a correct copy?

A. I checked every gauge reading on there with the original.

Q. What kind of a record was the original record?

A. Like the ones that you just submitted for 24 and 25.

Q. But it does not refer to the same location?

A. No, sir.

Q. The records from which these copies were made were likewise records made as part of the regular work in the Huntington office?

A. Yes, sir.

Q. And you are familiar with them as you were with Exhibits 110 and 111?

A. Yes, sir.

Q. And this record is similar in every way to the two exhibits that we have put in, except that this is a photographic or photostatic copy?

A. Yes, sir; it is a photostatic copy.

Q. And refers to Locks on the Kanawha River?

A. It is a photostatic copy of compilations that I had made. They are grouped there—six locks—three on the Kanawha and three on the Ohio. There would be one, say like this over here

[indicating] for each one of these, and I copied the gauge readings for a flow for that day at the Kanawha Fall.

Q. You know, then, that these figures are correctly copied from the above records?

A. Yes, sir.

By Mr. McClernan. I offer this as Exhibit No. 112 for the Government.

(The foregoing exhibit is marked as Government's Exhibit No. 112, and is filed with and made a part of this record.)

By Mr. Jackson. We would like to have the same understanding about that.

By Mr. McClernan. All right.

Q. I hand you Government Exhibit No. 113. Do you recognize that?

A. Yes, sir.

798 Q. Explain to the Court briefly what it is.

A. This is a chart on which has been plotted the graphs or recordings of the gauge stations at various stations on New River, one on the Greenbrier River and one on the Kanawha River at Kanawha Falls, and one on the Gauley River—plotted one above the other to show simultaneous gauge readings for the periods the stations were in use and the curve.

Q. How was this prepared?

A. We got from the United States District Engineer's office and from the United States Geological Survey prints of their graphs at the various gauging stations and then transferred them on there.

Q. Was that done under your supervision?

A. Yes, sir.

Q. You kept track of the work as it went on, did you?

A. Yes, sir.

Q. Was it correctly done?

A. I think so.

Q. You don't know of any error in it, do you?

A. Not at all.

Q. This appears to be a photographic copy.

A. Yes, sir; we have the original in the office.

Q. Is that an official record in the District Engineer's office at Huntington?

A. Yes, sir.

Q. Tell me, could an engineer read this graph and discern or understand it without the help from the person who prepared it?

A. I think so.

Q. This information which it represents can be obtained by an engineer without explanation by you or anybody else?

A. Yes, sir.

Q. I call your attention to a date, July 1932, in the upper left-hand corner.

799 Q. That is when it began, and at the other end, it shows when it ends—August 31st, 1932.

(Exhibit 113 offered in evidence.)

By Mr. JACKSON:

Q. Is this a copy of the one introduced in evidence [indicating]?

A. Yes, sir; that is a copy.

By Mr. MCCLERNAN:

Q. I show you Government Exhibit No. 114. Do you recognize it?

A. Yes, sir.

Q. Where did it come from?

A. From the United States Engineer's office at Huntington.

Q. It appears to be a photographic or photostatic copy?

A. Yes, sir.

Q. Where is the original?

A. In the office at Huntington.

Q. Is it an official record there?

A. Yes, sir.

Q. Explain to the Court what this is.

A. It is the same kind of chart that was presented for 1932.

Q. Except that it is dated July 1930?

A. Yes, sir.

Q. Was it made in the same way?

A. Yes, sir; it was made in the same way.

Q. Was it correctly made?

A. Yes, sir.

(Exhibit 114 offered in evidence.)

By Mr. JACKSON:

Q. What period is covered by the chart?

A. I will examine it.

Q. The date in the upper left hand corner is July 1st, 1930.

A. (Witness examines paper.) It ought to be down here [indicating]—August 31, 1930.

Q. That covers the same stations and the same streams as Exhibit No. 113, does it?

A. I declare I don't know whether it covers all of them. It covers all the recording gauges that were available.

Q. For the Kanawha River, the Gauley River, and the Ohio River?

800 A. Not the Ohio River, just for Kanawha at Kanawha Falls and stations on New River and where we had them on the Gauley River and the Greenbrier.

By Mr. McCLERNAN:

Q. I show you Government's Exhibit No. 115. Do you recognize it?

A. Yes, sir.

Q. Do you know where it came from?

A. From the United States District Engineer's office at Huntington.

Q. It appears to be a copy. Where is the original?

A. The original is in the District Engineer's Office at Huntington.

Q. It is the official record there?

A. Yes, sir.

Q. Is it kept in the regular course of duty in the office?

A. Yes, sir.

Q. Explain what this is briefly to the Court.

A. This is a chart similar to the ones just offered, except this chart is platted in terms of discharge, instead of gauge heights.

Q. These fluctuations in the lines that are here, represent differences in fluctuations of stream flow instead of differences in gauge heights?

A. Yes, sir.

Q. Is this correctly made?

A. Yes, sir.

Q. Did you supervise the making of it?

A. Yes, sir.

Q. Is this chart of such a nature that an engineer could discover the information it contains without explanation from you or anybody else?

A. I think so; yes, sir.

(Exhibit 115 offered in evidence.)

By Mr. JACKSON:

Q. What is the time period covered by that chart?

A. July 1930.

801 Q. July 1930, to when?

A. From the 15th to the 25th, inclusive.

Q. Of July 1930?

A. It was a short section in there. It takes part of the 16th and not the whole day on the 16th.

Q. It doesn't take the 15th in there either, does it?

By the WITNESS. I was thinking of the other end.

By Mr. JACKSON:

Q. Did I understand you to say that it was July 16th to July 30th?

A. The 16th is right. July 25th—July 16th to July 25th, just ten days.

Q. I show you Government Exhibit No. 116. Do you recognize it?

A. Yes, sir.

Q. Where did it come from?

A. From the United States Engineer's office at Huntington.

Q. It appears to be a photostatic or photographic copy of the original. Where is the original?

A. In the Huntington office.

Q. Is it an official record there?

A. Yes, sir.

Q. Is it kept as part of the regular duties of the office?

A. Yes, sir.

Q. Explain to the Court what this is.

A. This shows the back water.

Q. Explain it to the Court.

A. It shows the back water effect just below Winfield Dam, the Marmet Dam, and the London Dam. Flows of 2,000, 6,000, and 10,000 feet per second in the Kanawha River.

Q. Did you supervise the preparation of this?

A. Yes, sir.

Q. Is it correct?

A. Yes, sir.

Q. Is it of such a nature that an engineer, on an examination of it, could get the information it purports to show, without any explanation from you or anybody else?

802

A. I think so.

By the COURT. It shows what?

A. The effect of back water due to floods in the Kanawha River. You are able to keep water at the same level or same elevation at the top of the dams; there is more water comes in at the upper end of the pool. The upper part of the pool raises, but it does not at the dams, and this shows what it does at 2,000, 6,000, and 10,000 cubic feet per second.

By Mr. MCCLERNAN:

Q. Why is it the upper end of the pool behind the dam can be higher than the lower end?

A. They can keep it regulated at the lower end by raising the gates and letting the water pass underneath, instead of over them.

Q. Isn't it a fact that water will not flow unless it has somewhere to flow?

A. Yes, sir; that is true.

Q. Did you offer this? I offer this as Exhibit No. 116 for the Government.

By Mr. JACKSON:

Q. This shows that this exhibit was prepared July 7, 1936?

A. Yes, sir.

Q. And was it prepared for use in this lawsuit?

A. It was prepared by me at the direction of my superior.

Q. Did he tell you that it was prepared to be used in this lawsuit?

By Mr. MCCLERNAN. We object to that as being immaterial, irrelevant, and incompetent.

By the COURT. The objection will be overruled.

By the WITNESS. I knew it was.

803 By the COURT. Did you make them up for the purposes of this suit?

A. I made them up for the purposes of this suit.

By Mr. JACKSON. If it has not been covered by our general understanding, I want to reserve an objection that this is not an official document, but I do not want a ruling on it now until we examine them.

By Mr. MCCLERNAN. There is a sheet lacking in this set [indicating].

Q. I show you Government's Exhibit marked "117-a," "117-b," "117-c," "117-d," "117-e," and "117-f." Do you recognize them?

A. Yes, sir.

Q. Where did they come from?

A. From the United States Engineer's office at Huntington.

Q. Are these official records of the Huntington office?

A. Yes, sir; those are copies.

Q. Those are photostatic copies?

A. Yes, sir.

By Mr. JACKSON. I have not been objecting to counsel stating whether or not they were official records. I think it is an improper way to ask questions, because I think that is for the determination of the Court. I presume that no harm has been done.

By the COURT. No, sir; I don't think any harm has been done.

By Mr. MCCLERNAN:

Q. This is kept as part of the regular duty of the Huntington office?

A. Yes, sir.

Q. Where is the original?

A. In the Huntington office.

Q. Explain what these exhibits are.

804 A. These are rating curves for various dams on the Kanawha River and for dam No. 26 on the Ohio River.

Q. Tell us what 117-a is.

A. 117-A is the rating curves for old dams Nos. 2 and 3 of the New London Dam.

Q. Along the Kanawha River?

A. Yes, sir.

Q. What is 117-b?

A. 117-b is rating curves for old dams 4 and 5 on the Kanawha River, and for Marmet new dam.

Q. What is 117-c?

A. That is rating curves for dams 6, 7, and 8 on the Kanawha River.

Q. What is 117-d?

A. That contains rating curves for old Lock No. 9 and New Winfield Dam on Kanawha River; that should be dams, instead of Locks; old No. 9 at Winfield.

Q. What is 117-f?

A. E is next.

Q. What is 117-E?

A. That is rating curves for old dams 10 and 11.

Q. In the Kanawha River?

A. Yes, sir.

Q. What is 117-f?

A. That is rating curve for dam 26 in the Ohio River.

Q. The Court asked you, in connection with Exhibit 116, as to whether or not it was made for the purpose of use in this trial. Was this exhibit, or these exhibits, made up only for the purpose of use in this trial?

A. Yes, sir.

Q. That is, the photostatic copies?

A. The whole work was done for that purpose.

Q. Including the original rating curves?

A. Yes, sir.

Q. Didn't you have any other use for that in the Huntington office?

805 A. We have not had so far.

Q. What information do they show?

A. Well, they show different discharges—gauge heights, especially below those dams.

Q. Are they made up and do they show that information correctly?

A. Yes, sir; so far as we can get it.

Q. It is as nearly correct as possible?

A. Yes, sir.

Q. Is it made up in such form that an engineer could obtain the information they furnish without information from you or anybody else?

A. Yes, sir.

(Exhibits 117a, 117b, 117c, 117d, 117e, 117f offered in evidence.)

Q. Mr. Winn, I show you Government Exhibit No. 118. Do you recognize that?

A. Yes, sir.

Q. Do you know who prepared it?

A. It was prepared under my supervision in the United States Engineer office at Huntington.

Q. Is that true of all the detail on here?

A. No; this was information that was collected from different sources and put on this, but all from data in our office.

Q. Was it all prepared under your supervision?

A. All except this coloring matter was put in by Col. Watkins.

Q. That is everything on the exhibit was prepared in the Huntington office except the colored parts; is that right?

A. Yes, sir.

Q. Does it show correctly the data that it purports to show?

A. Yes, sir.

Q. Was it made up in the course of the regular duty of the Engineering Office?

A. It was.

Q. Is this a photographic or photostatic copy?

A. Either that or a print; I don't know which. It is a copy.

806 Q. Where is the original?

A. It is in our office in Huntington.

Q. Is it an official record there?

A. It is.

(Exhibit 118, being a diagram entitled "Kanawha River Profile—Six and Nine Feet Projects, etc." was offered in evidence.)

Q. Mr. Winn, I show you Government Exhibit 119. Do you recognize that?

A. Yes, sir.

Q. Do you know who prepared it?

A. Prepared in the United States Engineer Office at Huntington, West Virginia.

Q. Did you supervise the preparation?

A. Yes.

Q. Is it correct, as far as you know?

A. It is.

Q. Is this an original or a copy?

A. A copy, a print.

Q. Where is the original?

A. In the office at Huntington.

Q. Is it an official record there?

A. It is.

Q. Was all of this material appearing on the exhibit prepared under your supervision?

A. All except the coloring matter which was put on by Col. Watkins; also these two projects up here that are lettered with red.

Q. The part reading "Centralia Project" and "Ralph Project"?

A. Yes.

Q. Other than those two titles and the coloring matter, it was prepared in the Huntington office?

A. Yes; that is right.

Q. Does it show correctly the data which it purports to show?

A. Yes, sir.

Q. You say you put everything on it except the coloring matter and the titles?

807 A. No; he put on a couple of projects up here that weren't on the map that I sent him. They were projects that were studied in the Huntington office but no official report was ever made on them. They are not included in any printed official report. Col. Watkins put those on after he got them.

(Exhibit 119, being a diagram entitled "Kanawha River and Tributaries—Proposed Improvements, etc.," offered in evidence.)

Q. Mr. Winn, I show you Government Exhibit No. 120. Do you recognize it?

A. Yes, sir.

Q. Do you know who prepared it?

A. Prepared in the Engineer Office at Huntington, West Virginia.

Q. Did you supervise the preparation?

A. I did.

Q. Is it correct?

A. Yes, sir.

Q. Where is the original?

A. In the office at Huntington.

Q. An official record?

A. Yes, sir.

Q. Will you tell the court briefly what this is?

A. These are profiles of these streams.

Q. Name the streams.

A. The Greenbrier, New River, Gauley and Elk, showing the elevations of dams that were depicted on the map that you just handed me.

Q. Isn't it true that the vertical scale on this exhibit is very much different from the horizontal scale?

A. Yes, very.

Q. Isn't that true also of some of the exhibits we have already put in?

A. No; I don't think so. There might have been on that profile of the Kanawha River. Of course, the vertical scale there is a whole lot more higher than the horizontal.

Q. Did I ask you whether this correctly depicts the facts
808 that it purports to set forth?

A. Yes.

Mr. McLernan. I offer in evidence Government Exhibit No. 120.

A. The same thing holds there about the coloring matter. Col. Watkins put that on.

Q. That is, the coloring matter was not done in the Huntington office?

A. No.

Q. But everything else was?

A. Yes.

Cross-examination by Mr. Jackson:

Q. Mr. Winn, I first want to direct your attention to Exhibit 110, daily readings at Lock 24 on the Ohio River for the month of August 1918, and ask you where the gauge is located from which those readings were taken?

A. There are three gauges at the locks, one called the upper gauge which is above the dam. That has reference to the upper pool. The one called the lower gauge is downstream from the lock in the lower pool and a middle gauge about the middle of the lock. When the dams were up, the upper and lower gauges are read, but when they let the dams down only the middle gauge is read.

Q. Was there any construction work going on while any of these gauge readings were taken?

A. Only the first one. I have forgotten the exact date when that dam was put in operation but it shows on there by the magnitude of the gauge reading.

Q. Can you look at Exhibit 110 and tell me during what period covered by that exhibit construction work was going on?

Mr. McLernan. May I ask the witness a question?

Q. Mr. Winn, do you have personal knowledge of this construction work that is being discussed?

A. I have not.

The Court. He can say from that how far those readings were affected by construction work.

809 A. It is a matter of record. I just don't have it in mind.

By the Court:

Q. You can tell from that record?

A. Not exactly. I wouldn't want to swear to it, but I think I can tell it pretty well.

Q. Tell us what you know about it?

A. There is when they begun to read two gauges and the proper uniform gauge readings.

By Mr. JACKSON:

Q. The dates, Mr. Winn?

A. October 1923.

Q. And continuing how long?

A. Went right on after that.

Q. I am not clear. You mean up to that time construction work was going on?

A. Probably. It was certainly here.

Q. By "here" you mean——

A. 1918.

Q. August 1918?

A. Yes. It was here [indicating].

Q. And that is July 1918?

A. Yes. It looks like it had been partially constructed there because the lower pool gauge reading—no; it looks like it was constructed because here is the upper pool which shows a good-sized gauge reading, in 1920.

Q. October 1920?

A. Yes.

Q. Do you mean that the structure had been completed at that time?

A. It looks like that from these gauge readings, the size of them.

Q. You couldn't say definitely that the construction work had been completed even in October and September 1920?

A. No; I couldn't say that.

Q. And I suppose the same thing is true as to subsequent sheets?

A. No. After it is constructed, why then it goes straight on through.

810 Q. And when do you first get to the point where you can tell that definitely, is that October 1923?

A. Yes; it looks like it is. I can give you the exact dates, but I haven't them with me now.

Q. You can't at the moment, I understand?

A. No.

Q. Were these gauges automatic gauges?

A. No.

Q. They were not continuously recordings?

A. No; staff gauges.

Q. And read by some person from time to time?

A. Yes.

Q. How often were these gauges read, if you know?

A. They are read twice a day and during certain periods they are read every hour, but not on there.

Q. These data which you have here in Exhibit 110, are cases where the gauge was read merely twice a day?

A. Yes.

Q. It appears on the sheet headed October 1933, that the readings are for eight o'clock in the morning?

A. That is right. They are actually read twice a day, but some of them are recorded only once.

Q. You mean only one of the readings made was recorded?

A. And sent into the office; yes.

Q. Why was that?

A. Well, it was running along so uniformly that one reading a day indicated what happened.

Q. Then as far as the Exhibit 110 is concerned, we have only one gauge height and that is at eight o'clock in the morning?

A. Yes, sir.

Q. Do all of these gauge readings refer to the same datum plane, as far as you know?

811 A. Yes. It gives the elevation of the zeros of the gauges.

Q. The zero is the same on this for all the readings?

A. For all of the readings at each lock; yes.

Q. I meant Exhibit 110?

A. No; all of the gauges have different zeros. You asked me if they referred to the same datum. They do refer to the same datum—which is the United States Engineer datum. I mean that they refer to the same sea-level datum.

Q. Do all of the gauge readings on Government Exhibit 110, for Lock 24, refer to the same zero?

A. No. If you will notice the bott[illegible] of some of those reports, it gives the elevation of the zero of th[illegible]iddle gauge and the others it gives you the upper and lower.

Q. I think you said that these gauge readings on Exhibit 110 have not been published in any official report?

A. No; except as I qualified it. Sometimes they were telephoned to Cincinnati.

Q. And, as I understand it, you do not personally vouch for the correctness of any of these gauge readings?

A. No; I couldn't vouch for them. I didn't make the records.

Q. Mr. Winn, to the extent that these gauge readings are used or might be used to compute stream flow, would it make a difference whether the river was in part obstructed by construction work?

A. Oh, yes; that would give you different conditions for computing flow.

Q. And, of course, that would change from time to time, depending upon the status of the construction work?

A. Yes.

Q. And, of course, you don't know what the status of that construction work was from time to time or what variations occurred?

A. Not except as shown in those reports, because I wasn't even in that district.

Q. From the reports you deduced that there is a period
812 covered by this exhibit when construction work was going on but you are not able to tell what the status of the construction work was for different periods covered by the report?

A. No; I cannot.

Q. Before going to the other exhibit, will you tell me how far Lock 24 is above the mouth of the Kanawha River?

A. I can't give it to you offhand, but something like 25 miles, I would say. It is the second lock above the mouth of the Kanawha River.

Q. Could you verify that readily?

A. Well, not right here. I haven't the records here. I could if I were at the hotel.

Q. Will you give it to us informally?

A. Yes; I will be glad to.

Q. I direct your attention to Government Exhibit 111. This appears to deal with Lock 25 gauge readings. Do you recall that exhibit?

A. Yes, sir.

Q. And will you tell me where Lock 25 is with reference to the mouth of the Kanawha River, if you know?

A. It is five or six miles above the mouth.

Q. Will you in the same way verify that accurately from your data at the hotel and either directly, or through your counsel, supply it to us?

A. Yes.

Q. Will you look at Exhibit 111 and tell me whether or not construction work was going on in the river at the time when those gauge readings were taken?

A. It looks like for the first two periods, that is August 1918, and July 1918, and two months in 1920, there was construction but beginning with 1923 evidently the dam was in operation.

Q. As I understand you from your examination of the exhibit, it is your judgment that all of the gauge readings shown in the exhibit for any period of time prior to 1923 were readings
813 taken at a time when construction work was going on?

A. Yes.

Q. Did you make up these exhibits, 110 and 111?

A. I extracted them from our regular files—those sheets.

Q. These exhibits 110 and 111 are certain sheets extracted from certain files of gauge readings for these two locks?

A. Yes.

Q. Was that a selection that was made by you?

A. No.

Q. You were directed to extract certain particular sheets and have them bound into an exhibit?

A. Yes.

Q. And who directed you to do that?

A. Mr. Davenport, I believe, asked me to it.

Q. Who is Mr. Davenport?

A. He is an engineer in the Division E gineer's Office at Cincinnati.

Q. Were these exhibits made up recently?

A. Just, in fact, since I came to Roanoke. I extracted them from the regular files which are about this thick [indicating] for each lock.

Q. Are there three gauges at Lock 25, arranged in somewhat the same fashion as you described for Lock 24?

A. Yes.

Q. And what kind of gauges are they?

A. Why, I really couldn't tell you. They are staff gauges. I think they are tiles set right into the lock walls up to the top of the lock walls, and from there on up they sometimes go on the stairway leading up to the lock house and different ways, but I am not familiar with them.

Q. Particularly, are they automatic continuous recording gauges?

A. They are not.

Q. They are staff gauges which have to be read?

A. Yes.

Q. And how often are they read a day?

814 A. Usually read twice a day, I think, except during high stages and then they are read every hour.

Q. Is it true that the sheets which are shown on Exhibit 111 contain only one reading a day for the period covered?

A. I don't see but one reading a day on any of them.

Q. And that I understand from the charts to be an 8 A. M. reading?

A. Whatever it says on that chart.

Q. And I suppose, as in the case of Lock 24, you personally can't vouch for those readings?

A. No.

Q. You say that Exhibit 110 is gauge readings at Lock 24. Will you describe what Lock 24 is like: Is there a dam in connection with it?

A. Yes; a movable dam composed of a certain section called the navigable pass and a certain other section called the Weir section and it has one or more bear traps. I don't remember how many 24 has. That is to regulate the water in the pool so as not to have to manipulate the wickets.

Q. Would you, for my information, describe the bear traps and the wickets and navigable pass?

A. Well, the wickets are what is known as Chanoine wickets. They are fixed so they can be tripped, four feet wide and of varying heights, depending on the height of the dam, and they can be tripped so that they let down in the water and when the water gets low enough they are raised back in an upright position to keep the pool up.

Q. Can you describe the navigable pass?

A. That is usually from five to six hundred feet wide and is surmounted by these wickets which are let down, and over that the navigation takes place when it is not necessary to have the dam up.

Q. That navigable pass is where the wickets are?

A. It is on the weir too, the Chanoine Weir. We have a weir that they control until they get ready to throw the whole dam down and then they let the navigable pass down and the boats go over that.

815 Q. Will you spell that name?

A. C-h-a-n-o-i-n-e.

Q. Am I right in understanding that the weir is a low concrete dam in the bed of the river?

A. It has a low sill, but it is surmounted by these Chanoine wickets just like the navigable pass.

Q. You say the wickets are four feet high?

A. Four feet wide.

Q. And the height varies from what?

A. They span four feet with the needle that goes on them. They don't fit exactly together so they have square timbers that they let down in there to tighten up the dams when they have a lack of flow of water and they put them in there on the diagonal, float them into these cracks to make the dam tighter. They call them needles.

Q. Did this apply to the navigable pass?

A. To both; wherever the Chanoine wickets are used, they use those needles.

Q. Do wickets extend across the whole length of the dam?

A. Oh, yes; across that part of it. Of course, the bear trap takes up some and the locks take up some more.

Q. Starting from the end where the locks are, what comes next, what section of the dam?

A. I think the navigable pass comes next to that, then the Chanoine weir comes next to the bear trap and then the bear trap. They vary at different locks, different dams.

Q. Is there any weir in the navigable pass at all?

A. No; it is a weir in itself.

Q. Could you describe it for me, I don't quite get it?

A. These navigable passes are about five to six hundred or more feet wide, the purpose of which is when they have to let the dam down more water flows down than they can take care of through the bear traps; they have to let the whole dam
816 down and the boats pass through those spaces five or six hundred or more feet wide.

X Q. You mean the wickets by letting the whole dam down?

A. Yes, sir; the movable part of the dam.

X Q. You don't have to let all the wickets down at once?

A. No; you can't let all down at once.

X Q. You can have part down and part up?

A. Oh, yes.

X Q. In the weir section are they all concrete?

A. They have some fixed weirs that are all concrete. They vary at different locks, some stand three feet.

X Q. It is Lock 24 I want you to describe?

A. I could not tell. I have not had any connection with the operation section and am not familiar with that district. I can get you that information if you want it. I can give you a sheet with all that on it.

X Q. Could you describe a little more fully what the bear trap is?

A. Well, it is a gate composed of two leaves, one working over the other. It is held up in position by pressure of water from the upper pool, and when they get ready to let it down, they close off the water from the upper pool and let the water out from under the leaves, and it comes out in this position [indicating with hands], and when they want to raise it they close the lower valves and let the water in under these leaves, and that is usually a space 90' wide. That is about as well as I can explain it.

X Q. Is it two leaves, 90' wide?

A. Yes, sir.

X Q. One over the other?

A. Yes, sir.

X Q. So as far as the bear trap is concerned, the whole 90 feet has to be operated at once?

A. At one time.

X Q. Will you furnish us the sheet you said will make that a little clearer?

817 A. I will give you the dimensions. I don't know it will make it any clearer to you.

X Q. I understand from you the greater part of the length of this dam is topped with wickets, or composed of wickets?

A. Yes, sir.

X Q. And what is the space between the wickets?

A. Generally supposed to be about four inches, but they are not very rigid, so some are wider and some narrower, they use square timbers that are either 5 x 5 inches or 6 x 6 inches, and they are dropped in there on the diagonal so it will fit in the crack and stop it up.

X Q. Dropped in there to stop the water?

A. Yes, sir; to stop the leakage.

X Q. And if those are not put in then a considerable quantity of water flows between the wickets?

A. Yes, sir; at low flows if they didn't put the needles on, the pools above would drop below the crest of the dam, in fact the needles don't stop it at low stages, they have to chink the cracks with leaves, and cinders and things of that kind.

X Q. Are those needles always in place when the wickets are up?

A. No; only when there is such a low flow water would get below normal, normal pool level, if they didn't put them in.

X Q. And then, as I understand you, when the water gets very low they have to chink up these needles?

A. They have to further chink up the cracks of the dam with cinders and other things.

X Q. Is that always done in a fashion to prevent leakage?

A. Doesn't entirely prevent it; no.

X Q. Well, I presume, that the effectiveness of the chinking up varies a good deal from *tiem* to time, with the manner in which it is done; is that true?

A. It might be; yes.

X Q. Well, do they have to rechink from time to time,
818 during low-water season?

A. I don't know, as I said I have never been in the operating end of the office down at Huntington.

X Q. As far as you know that may be required more than once during a season?

A. Yes, sir; it can be, I can readily see why it would be.

X Q. Mr. Winn, to the extent that there is leakage through those wickets, would there not be a different stream flow for a given gauge height at the upper pool?

A. Yes; you mean if the leakage was greater or less.

X Q. Yes.

A. Yes; it would affect it.

X Q. That is, the gauge height at the upper pool might correpond with a good many different flows at that particular point, lepending on how much chinking or needling had been done at hat dam?

A. Yes, sir.

X Q. Does the volume of flow at the dam, or rather the rate of low at Dam #24 depend wholly upon the gauge height at the pper pool or is it affected by the difference between the gauge eight at the upper pool and lower pool?

A. No; that is illustrated in the case of the Roller dams, they im to keep that at the same level, yet you get a tremendous amount f flow under the dam and your gauge above the dam won't change.

X Q. So that the mere knowledge of the gauge heights above he dam wouldn't permit any accurate determination, standing lone, of the flow?

A. No.

X Q. It wouldn't even permit an approximate determination of he flow, would it?

A. Not without taking other things into consideration, the mount going through your cracks, between your wickets.

X Q. Mr. Winn, I direct your attention to Government Exhibit #110, and ask you whether the report shows the extent 19 to which needles were in place in the dam or the extent to which chinking may or may not have been used?

A. I don't see any reference to it in here.

X Q. Will you look at Exhibit #111 and tell me if there was nything on that exhibit to tell the extent the needles may or nay not have been in place or chinking may or may not have een in place?

A. I can't tell anything about it, as far as I have gone, it doesn't ay anything about chinking in the dam, but does give some of he operation of the Bear traps.

X Q. Will you state on what sheets of Exhibit #111 there is hown the operation of the bear traps?

A. September 1925 shows bear trap and fifteen wickets down, nd bear trap and fifteen wickets up next day, and bear traps and an wickets down and then up. There is some more information n the sheet of August 1925.

X Q. Where that says on one line bear trap and fifteen wickets own and the next line bear trap and fifteen wickets up, that neans they put back those fifteen wickets?

A. Yes, sir.

X Q. There may have been more wickets up, however?

A. The rest were apparently up.

X Q. I direct your attention to the third sheet of Exhibit #110 hich is headed for the month of October 1920, and particularly

direct your attention to the third column showing some pencil figures under the heading "Dam down" middle gauge, while there is concurrently shown two other columns "Dam up" upper and lower pool, and ask you how there could be concurrent records for the "dam down" and the "dam up," if you know?

A. I take that to mean that is what it would have read on the old low-water gauge, because it was put in in pencil and not on the typewriter.

X Q. What did you mean by old low-water gauge?

A. One they used before any dam was there, and it was usually referred to as low-water gauge.

820 X Q. Is that the same as middle gauge on this chart?

A. Yes; same thing. I can only interpret this. I don't know just what those figures mean.

X Q. What do you mean by low water in reference to this low water gauge?

A. That was one that referred to low water before any dams were built, in other words, the zero of the gauge was supposed to be at low water.

X Q. Was that supposed to be above sea level?

A. Yes, sir.

X Q. Are you sure these figures on Exhibit #110 beginning with the sheet for October 1920, in the third column from the left under the heading "dam down" and continuing similarly for the rest of the sheets of the exhibit do not have something to do with construction?

A. No; I can't tell you what those figures mean.

X Q. I gather from what you say you don't know what they do mean?

A. I think they mean what the water in the upper and lower pool would have read if it referred to that middle gauge, but I can't be sure.

X Q. If it does mean that, you don't know if the figures are accurate or not?

A. No; I wouldn't say that those pencil figures are accurate, but I would rely on these others.

X Q. The typed figures?

A. Yes, sir.

X Q. Will you look at the sheet of October 1920, and tell me if you don't think that page indicates construction?

A. I could not tell by that.

X Q. Now, I direct your attention to Government Exhibit #112, and ask you who prepared that exhibit?

A. It was prepared under my supervision at Huntington.

X Q. Was it a routine matter?

A. No; for this particular case.

X Q. Prepared for this lawsuit?

A. Yes, sir.

821 X Q. I direct your attention to the first column on the left at each of the sheets of Exhibit #112, which purport to show "Stream flows at Kanawha Falls" for certain dates, and ask you where you got those stream flows?

A. From the Water Supply papers of the U. S. Geological Survey.

X Q. Can you tell me what paper number it was?

A. No; I can't for those particular days, though the dates are put there.

X Q. You, of course, merely copied them, or had them copied out of the Water Supply papers, and do not vouch for them in any way?

A. I had them copied and checked them.

X Q. You checked them with the Water Supply papers?

A. That is all.

X Q. And have you any other information, or is that all you know about them, that they appear in those papers?

A. Yes, sir.

X Q. Now on the first sheet the second column is headed No. 2, and that refers to "Dam 2" does it not?

A. Old Dam #2, on the Kanawha River.

X Q. Was that the first dam below Kanawha Falls?

A. It was.

X Q. Isn't it a fact there never was any dam built higher upstream than Dam #2 by the Government?

A. That is a fact.

X Q. There was never a #1 Dam by the Government?

A. No.

X Q. What kind of a dam was that, do you know?

A. It was a fixed dam.

X Q. Fixed dam with a lock?

A. Yes, sir.

X Q. Was it built of concrete?

822 A. I think it was a timbered crib, stone-filled, and possibly concrete slab on top. I am not sure. I never saw it.

X Q. It didn't have any wickets, did it?

A. No wickets in it.

X Q. Was lock #2 on the Kanawha known as a tight dam or leaky dam?

X Q. Well, you have been testifying about the records in this office, Mr. Winn, doesn't it appear from those records that Dam #2 was a very leaky dam?

A. Haven't you the record before you? It shows it is leaky.

XQ. The record shows it is leaky?

A. Yes, sir. The upper gauge on that dam would read 19 feet at normal pool when at the crest of the dam and you can see at times it gets 1½ feet below the crest of the dam.

XQ. What does that indicate with reference to the dam being leaky?

A. It means it is leaking more water through it than the flow of the river is supplying, if you had 1,000 feet flow at Kanawha Falls more than 1,000 feet were leaking through that dam.

XQ. Do you know whether the rate of leakage was constant?

A. I don't know as to that.

XQ. Do you know whether the leakage was constant from time to time?

A. I know only what those records show there, and similar records.

XQ. Now, Mr. Winn, referring to Exhibit #112 these stream flows from Kanawha Falls were obtained from what gauge readings, according to the Water Supply papers, from which you compiled them?

A. I took them from the Water Supply Paper. I don't know what the gauge readings were. I just took the flow as published in those Water Supply papers.

XQ. You don't know what the gauge readings were?

A. No; not offhand.

XQ. Do you know if there was an automatic gauge there at that time?

A. I know there wasn't, but later on the next sheet will show the period when there was.

XQ. You mean that was in 1925?

823 A. I think not, I think it was put in in 1928, according to testimony given here by U. S. Geological Survey people.

XQ. You mean that wouldn't be true until the third sheet. The second sheet is for 1925.

A. There are four sheets.

XQ. The next column, the third one on each sheet of four sheets, of Government Exhibit #112, has No. 3 above it, and as I understand it refers to dam #3 on the Kanawha River?

A. It does.

XQ. Is that the same kind of dam as dam #2?

A. It was a fixed dam and I think of the same type.

XQ. That is one of these crib dams?

A. Yes, sir.

XQ. Does the record show whether it leaked?

A. You can tell by that (referred to the exhibit). Yes; it shows it is below the crest.

XQ. The water level?

A. Below the crest. 20.67 is the gauge reading for normal pool.

X Q. The next one is 18.5, September 1, showing it is over two feet below the pool, normal pool?

A. The difference between that and 20.67. Yes, sir.

X Q. That, I understand, shows the leakage is greater than the flow of the stream at that time?

A. Yes, sir.

X Q. The next column is #4, dam on the Kanawha, as I understand it?

A. Yes, sir.

X Q. Can you tell me what kind of dam that was?

A. That was a movable dam.

X Q. And can you briefly describe what you mean by movable dam?

A. Wickets that are laid down and raised as conditions require.

X Q. With a lock?

A. Lock; yes, sir.

824. X Q. And the wickets are operated generally in the same way you described in connection with dam #24 on the Ohio River?

A. Yes, sir; I think so.

X Q. They required needling and chinking at low water?

A. You will find in there where it was chinked once and raised two feet the next morning, you will see a footnote on one of those pages there.

X Q. I notice on dam #4 it shows September 4th gauge height 12.8 and September 5th gauge height 14.7 and a footnote saying #4 caulked with cinders on September 5, 1925, that is the instance to which you had reference?

A. Yes, sir.

X Q. Does this record show this #4 dam was also a leaky dam?

A. All of those movable dams are leaky.

X Q. And the amount of leakage depended upon the amount of needling and caulking?

A. Yes, sir.

X Q. And possibly upon any other defects that might be in the dam?

A. Yes, sir.

X Q. The last three columns are headed, respectively, 26, 27, and 28. What are those dams?

A. They are on the Ohio River.

X Q. Your Exhibit #110 was for dam #24 and #111 for dam #25, is that right?

A. Yes, sir.

XQ. And these are for entirely different dams?

A. Yes; coming right on down the river.

XQ. Where is dam #26, approximately, with relation to the mouth of the Kanawha River?

A. It is down ten or twelve miles below the mouth.

XQ. Ten or twelve miles below the mouth?

A. This note says 13.2 miles so I guess I was a little off, but
825 that is approximately.

XQ. And dam #27, where is it with refere ce to the mouth of the Kanawha?

A. It is about five miles from Huntington.

XQ. And 28?

A. At the lower edge of Huntington city limits.

XQ. Which one of the old Ohio river dams is nearest to the Gallipolis?

A. Dam #26.

XQ. Is that #26 below the Gallipolis dam?

A. Above.

XQ. It is above the mouth of the Kanawha?

A. No; it is below the mouth of the Kanawha.

XQ. Is the Gallipolis dam under construction?

A. Yes, sir.

XQ. What effect does it have on dam #26? That is on the Ohio River, I believe.

A. Covered up.

XQ. The completion of the Gallipolis dam will flood out dam #26.

A. Yes; and 24 and 25.

XQ. Mr. Winn, I direct your attention to data for October 29, 30, and 31, on Sheet 1 of Exhibit #112, which as I read the chart, shows the three days of low flow at Kanawha Falls and shows Locks 2 and 3 as substantially, or at least, somewhat below normal pool levels, and locks 4 and 26 above normal pool levels, and ask you whether that indicates that the subnormal levels in the pools at the upper dams Nos. 2 and 3 in comparison with the above normal levels in dams 4 and 26, results from the leaky condition of dams 2 and 3?

A. Dam 26 certainly wouldn't be affected by it, 26 is on the Ohio River, and probably had enough water there to maintain it.

XQ. How about the relation between the stages of pools
826 2, and 3, and pool 4?

A. Well, I would say that pool 4 had been chinked up and was good and tight and much tighter than fixed dams that were leaky.

XQ. Mr. Winn, can you tell me whether any construction work was going on in the river, either the Kanawha or the Ohio, at the time of the gauge readings shown on Government's Exhibit #112?

A. I can't except as indicated there "dam incomplete" note there.

XQ. On Sheet 1, under dam 4, there is a notation that for the period October 11 to October 18, 1921, the dam was down; why would the dam be down during a period of low water?

A. I don't know unless it was for repairs.

XQ. And then under lock 27 on the Ohio on sheet 1, 1921, appears the notation "dam incomplete"; are you able to say from that whether that would indicate according to your records there was construction work going on at that time?

A. I couldn't tell from that. I could give you the figures, they are available exactly when that dam was put into operation.

XQ. The notation "dam incomplete" shows the construction has not been finished.

A. Yes, sir.

By Mr. JACKSON:

Q. Mr. Winn, last Friday I asked you to give the distance of Lock 24 above the mouth of the Kanawha River which you agreed to do as soon as you could check it. Have you that information with you?

A. What is the information?

Q. What is the distance of Lock 24 above the mouth of the Kanawha River?

A. It figures 23.2 miles. Does that agree with the memorandum?

Q. I have 22.8 on the memorandum. Is it about 23 miles?

A. 22.7 is right. I had the wrong figure. I had a bridge instead of the mouth of the river.

827 Q. Give us the distance of Lock 25 above the mouth of the Kanawha River?

A. It figures near 5 miles.

Q. And what is the distance of Lock 26 below the mouth of the Kanawha River?

A. 12.8 it figures by this. This is the old Ohio River book. It has been revised in the last year but I didn't know the distances had been revised.

Q. It would be approximately accurate for those distances?

A. Yes.

Q. What is the distance of Lock 26 above the Gallipolis Lock?

A. This was made before the Gallipolis Dam was started and I haven't that, but it is just a short distance above Gallipolis. Lock 26 is just a short distance above the Gallipolis Lock.

Q. What would be your judgment, one mile or five?

A. Less than a mile.

Q. Your exhibits on these gauges, 110, 111, and 112, show the upper pool level for dams 26, 27, and 28, but they do not show

the upper pool levels for dams 24 and 25. Will you state the upper pool level for dams 24 and 25?

A. If I have it here.

A. I can give you those elevations here now from this book.

By Mr. JACKSON:

Q. Will you give the normal upper pool elevation for Lock 24?

A. 535.5.

Q. And normal upper pool elevation for Lock and Dam 25?

A. 528.5.

Q. Your Exhibit 112, for instance, has a line that reads "upper pool elevation," and another line below it reads "upper pool gauge readings, normal pool." Am I right in understanding that the first column is the datum plane of the upper pool when it is at normal level?

828 A. Yes; that is the elevation.

Q. And the upper pool gauge reading, normal pool, is the reading that the gauge should have when the pool is at its proper elevation with reference to the datum plane?

A. Yes.

Q. By proper I mean normal?

A. Yes, sir.

Q. Referring again to the pencil figures under the column headed "Dam down" on sheets 3 to 16, inclusive, of Exhibit 110, and 5 to 18, inclusive, of Exhibit 111, were those figures added after the original report was received at the Huntington office?

A. Yes.

Q. Do you know who added them?

A. I do not, nor for what purpose. I can only assume for what purpose.

Q. You don't know why they were added of your own knowledge?

A. No. Somebody was making a study of back waters or something of the kind and just put them in there as what the gauge would have read if the dam was down.

Q. You don't know when that was done?

A. I do not.

Q. Isn't it a fact that those figures represent only a hypothetical condition?

A. Yes; I think so. That is my idea.

Q. The dam wasn't down at those times, so there couldn't have been any actual readings corresponding to that condition; is that right?

A. Yes; that is right.

Q. Do you vouch for the accuracy of those pencil figures?

A. No, sir.

Q. Do Government Exhibits 110 and 111 show the status of the dams for which gauge readings are given during the periods included in the exhibits in the matter of needling and caulking?

829 A. No; I don't think so, only in a few cases. No; I don't think any of them show that from my recollection.

Q. The exhibits are here and they will be handed you if you have any doubt about it?

A. You know we discussed the other day the operation on two occasions or more when it referred to bear traps down and so many needles down, and bear trap up and so many needles up. They were the only gauges that I could pick out.

Q. Those were only so many wickets up. There was nothing with reference to needles?

A. Nothing about needles—wickets.

Q. So there is nothing on any of these exhibits to show the condition of the dams with respect to needling or caulking at any time, is there?

A. Not that I recall.

Q. And do you, in fact, know the status of these dams in the matter of needling and caulking for the periods covered by Exhibits 110, 111, and 112?

A. No, sir; I know nothing about it, because I wasn't there at the time and I haven't had anything to do with operating the dams since I have been in the Huntington district.

Q. Can you say, from your observation, whether lock attendants at times failed to needle and caulk dams when they should be needled or caulked?

A. I have no information on that subject at all as I have had no connection with it.

Q. You haven't made any observation?

A. A good many locks on that river, I have never been to—down on the lock walls.

Q. Do you recall, Mr. Winn, that the sixth sheet of Exhibit 111, being the reading for Dam 25 in the month of September 1925, shows maneuvering of the bear trap and 15 of the wickets?

830 A. Yes, sir.

Q. I show you the sixth sheet of Exhibit 110, being the sheet showing the gauge readings for Dam No. 24, likewise during the month of September 1925, and ask you whether that sheet shows any maneuvering of the dam during that month?

A. It does not.

Q. As bearing upon the probable accuracy of those sheets, would you think it likely that if Dam 25 required maneuvering of the bear trap and wickets during September 1925, it would not be necessary to maneuver dam 24 also?

A. I can't answer that.

Q. You have no judgment about that?

A. No; I wouldn't know the conditions.

Q. You are not sufficiently informed on the subject to express any opinion as to the probable accuracy of records which show one of two successive dams manipulated with no manipulation of the other during the same period?

A. No; I haven't any knowledge of the accuracy of any of those figures except that they are the official records of the Huntington office and I have handed them in for that purpose.

Q. On that point, Mr. Winn, you will observe on Exhibit 110 that the sheets in connection with Dam 24 for November 1931, October 1931, September 1932, August 1932, and October 1933, are not signed by the Lock Master and do not bear any stamp of the United States Engineering Office at Huntington. Is it not a fact that records of that character are not official records of the Huntington office or of the readings of the Lock Master at that lock?

A. These all seem to be signed.

Q. I direct your attention, for illustration, to the sheet for November 1931, on Exhibit 110, and ask you whether that sheet is signed by the Lock Master?

831 A. Not the Lock Master but he was connected with the operation, probably had charge of the office from which this was sent to the Huntington office. It is signed by a representative of the——

Q. Signed by Assistant Engineer.

A. Yes; but right now this man has charge of all the operations of all the locks in the district.

Q. But he doesn't take the readings at the locks?

A. He does not. He just makes a transcript of the record as sent in from the various locks and then enters them here.

Q. Did he have charge of the operation of that lock at that time?

A. I don't know. I wasn't there.

Q. Does that sheet bear any stamp of the United States District Engineer's Office?

A. I don't see any date of receipt on here.

Q. Isn't it a fact that the records of gauges which are made and signed by Lock Masters do bear a stamp of the Engineer's Office when they are received?

A. They are supposed to be stamped when they come in—all communications—but sometimes they didn't stamp them.

Q. Is there any significance that in this case the sheet signed by the Lock Master are so stamped and those signed by the Assistant Engineer for the periods which I have described are not stamped?

A. I don't know that that has any significance. As I say, I have no personal knowledge of those things. I simply extracted them from the official records of the Huntington Office.

Q. You understand I am not criticising you. I am trying to get the facts.

A. I don't know the facts as connected with that.

Q. Isn't it a fact that the original records of the gauge heights are made by the Lock Master at the lock?

A. Yes.

832 Q. They are signed by him, are they not?

A. I don't know whether they are signed by him or not.

Q. For instance, is the report for October 1923, signed by J. A. Graham, Lock Master, typical?

A. That is signed by him but I don't know the practice in that because I have nothing to do with the operation of the locks.

Q. You don't know whether any of these sheets which you have produced and which have been bound up into Exhibits 110 and 111 are the original gauge sheets made up in the regular course of business of the Huntington office, do you?

A. I don't know whether they are not. I simply know they are recognized as the official records of that office and have been so used in the past.

Q. I also observe that on Exhibit 110 the gauge sheets for Dam 25 for November 1931, October 1931, September 1932, August 1932, and October 1933, are not signed by a Lock Master and do not bear the stamp. I suppose you do not know anything more about those records than about the records for the similar months for Lock 24 which are included in Exhibit 110?

A. I do not.

Q. Mr. Winn, I direct your attention further to your Exhibit 112 which is the gauge readings at Locks Nos. 2, 3, and 4, Kanawha River and Locks Nos. 26, 27, and 28, Ohio River, during low water periods of 1921, '25, '30, and '32, and ask you whether those gauge readings shown for those various dams are only the gauge readings at the upper pool?

A. Yes.

Q. Do you know for what hour of the day those gauge readings were taken?

A. They were taken from sheets similar to the ones we have just been discussing and while it is not put down here, I assume they are 8 A. M. readings.

833 Q. That is they show a single reading for the day, taken at 8 o'clock in the morning?

A. Yes; that is my recollection of it.

Q. And, of course, they severally refer to staff gauges and not automatic recording gauges?

A. Yes.

Q. Mr. Winn, in the case of movable or wicket-type dams like Nos. 24 to 28, shown on these exhibits which you have offered, and taking them particularly during periods of low water flow, I understand from your testimony last Friday that for a given flow in the river the gauge of the pool is affected by the amount of leakage through the wickets of the dam which retains the pool; is that right?

A. Yes.

Q. Am I right in understanding that for that reason the relation between stream flow and gauge height for any particular gauge height is not constant but depends upon the degree to which the needles have been placed and the dam has been caulked?

A. In some measure; yes.

Q. Would that inconstant relationship between gauge height and river flow apply during relatively low water to the stages at the upstream end of such a pool, the upper gauge, in other words—the lower gauge of the dam above but the upper gauge on that pool?

A. I don't know that I get your question just exactly.

Q. You have just said that in interpreting these charts the relation between the gauge height as shown by the upper gauge and the flow depends upon the amount of leakage through the dam that retains the pool?

A. Yes.

Q. And from that I understand that the relationship between the flow of the stream and the gauge height shown on the upper gauge would vary in accordance with the variation in the leakage through the dam retaining that pool or the dam immediately below the gauge; is that right?

834 A. Not entirely. They might open up the bear trap of the upper one, you know.

Q. I understand, but assuming no other complicating conditions, there would be a variation in proportion to the variation in leakage?

A. Not directly in direct proportion, but it would have some effect on it certainly.

Q. The question I am asking you is whether at low flow there would not be a similar variation between the flow of the stream and the gauge height shown by the gauge at the upper end of that same pool which I understand to be ordinarily described as the lower gauge for the dam immediately above?

A. Yes; that would depend in some measure on the height of the water at the dam downstream. If you had it just at the crest

of the dam, it would be one thing and if you drew it down a foot it would be another and if you had a foot over the crest, it would be another effect at the upper end of the pool.

Q. But leakage would tend to pull it down, would it not?

A. It depends on the height of the water at the lower dam.

Q. Leakage would never tend to raise the pool, would it?

A. No; it wouldn't. It would reduce it.

Q. Something might overcome the effect of the leakage, but the effect of the leakage would always be in the direction of lowering the pool?

A. Yes.

Q. Mr. Winn, you offered Friday, Exhibits 110 to 120, inclusive. Do you have them well enough in mind to tell me whether Exhibits 110 and 111 are not the only routine or regularly kept documents of the Engineering office included in those exhibits?

A. You mean whether there is any other record?

Q. I want to know if all the other exhibits offered by you, other than Exhibits 110 and 111, are not documents especially prepared for this lawsuit?

A. Yes.

835 Q. Referring back to Exhibits 110 and 111, do you know that those sheets which do not bear the signature of the Lock Master and which do not bear the stamp of the United States Engineering Office at Huntington, were not prepared especially for this law suit?

A. They were not. Those sheets were in a big folder covering a number of years, month after month, and I simply extracted them from those folders.

Q. I want to direct your attention now to Exhibits 117-A to F. Would you like to have them?

A. I would; yes.

Q. First, I direct your attention to the curve on Exhibit 117-A which is labeled "Lower London Pool with old Lock No. 3 in place," and ask you when the condition described by that curve or label existed?

A. These curves were all made up by bringing flows or discharges down from the Kanawha Falls gauge or Lock 2 gauge and then selecting——

Q. You don't understand.

A. I was going to explain how they were made and that will probably answer your question.

Q. No; it doesn't. I ask you when the condition shown on your exhibit and described as "London Lower Pool with old Lock No. 3 in place" existed?

A. For a number of years.

Q. Give me the period of years?

A. I have forgotten now. I can't recall just how many years we considered in there.

Q. Lock No. 3 was the second of the old dams on the Kanawha River, was it not?

A. From the head; yes.

Q. And the London Dam took the place of what dam?

A. It was between 2 and 3.

Q. It took the place of what dam—just No. 2?

836 A. It replaced 2 and extended the navigation further up the river.

Q. Was 3 just downstream from the London Dam?

A. Yes; some distance down stream.

Q. Approximately how far?

A. I can tell you if you will let me look at the book.

Q. You can look at the book if you like.

A. All the distances are in here. I thought I had it, but I don't believe I have.

Q. Give your best judgment. You know about what it was?

A. I would say a couple of miles.

Q. Isn't it a fact that Dam No. 3 was being removed before the London dam was completed and its pool filled?

A. I don't remember just when it was removed but I think most of it was removed before the London pool was raised.

Q. Is it not a fact that there never was a time when the London dam was completed and its reservoir filled and Lock No. 3 also in place?

A. I don't know. I can't tell you that. I had nothing to do with the removal or with the operation of the lock.

Q. This exhibit was made up under your direction, was it not?

A. Yes.

Q. Don't you know it to be a fact that Lock No. 3 was removed before the London dam ever went in operation?

A. I assume that it was, but I don't know.

Q. So that there never could have been a time when there was a flow through the London pool at normal level and Lock No. 3 in place, could there?

A. No; that was just figured from backwater curves.

Q. And this curve headed "London Lower Pool with old Lock No. 3 in place" is just a hypothetical development of a condition that never, in fact, existed, isn't it?

A. Probably so.

Q. And old Lock No. 3 is not now ir existence?

837 A. No.

Q. And hasn't been in existence for several years?

A. The dam hasn't.

Q. The dam and lock?

A. I think the locks have been removed too, all except one wall of it.

Q. Now, you have on this plaintiff's Exhibit 117-A several other curves which are respectively designated "Lock No. 2—open river," "Lock No. 2—lower pool," "Lock No. 3—lower pool." I ask you whether it is not a fact that both dams 2 and 3 are no longer in existence?

A. No; they are not.

Q. And those dams have not been in existence for several years; is that right?

A. No; they have not.

Q. So that those curves which purport to reflect conditions with relation to certain pools or open stream flows of Lock Nos. 2 and 3 deal with conditions that do not now exist and have not existed for a considerable time past; is that so?

A. No; they haven't, but this curve shows what did exist, what did happen when those locks were in existence.

Q. That, of course, wasn't true with reference to the first curve, the London lower pool with old Lock No. 3 in place, the top curve?

A. (No response.)

Mr. JACKSON. If your Honor please, I desire to make a motion to exclude all curves on Plaintiff's Exhibit 117-A dealing with Lock No. 2 or Lock No. 3, because it appears that they relate to conditions which do not now exist and did not exist for sometime, at least, prior to the commencement of this lawsuit and they can, as I see it, have no relevancy to the determination of the suit and will only introduce a collateral issue.

The COURT. They may have some materiality on the general question of the water flow of the river. I don't know. You can point out in your argument the lack of materiality. I will let them stay in.

Mr. THOMPSON. We are going back as far as 1925, the conditions in 1925.

Mr. JACKSON. May the record note our exception to the refusal of our motion.

X Q. I direct your attention to the curve which is entitled "Lock #2 Open River." What do you mean by open river, Mr. Winn?

A. The dams down or without any dams in the river.

X Q. Which do you mean?

A. That lock #2—what is that question?

X Q. I asked you what you meant by open river, and I understood you to say either with the dams down or without any dams in the river.

A. Taking them to be the same thing; yes, sir.

838 X Q. What do you mean by open river?

A. What we refer to as open river is when no dam is up or it might apply to the condition before any dam was built.

X Q. Well, is the dam with the wickets down the same as no dam in the river?

A. Practically, it may be a little swellhead right at the dam, but its effect is not felt for any distance in the pool.

X Q. Referring to curve "Lock #2" in the river, which you say is with dam down; what dam down is that?

A. It just shows where this curve ties in to Lock #2, with all the dams down, ties in with it above the lock.

X Q. You said with all the dams down?

A. Yes, sir.

X Q. You mean all the dams on the Kanawha River?

A. This one and the ones adjacent.

X Q. That means lock #2 and what other dams down?

A. #3 and #4 if you want to put it that way.

X Q. Then Exhibit #117-a is supposed to show a condition with locks 2, 3, and 4 down, or dams 2, 3, and 4 down; is that right?

A. Yes; this upper part of this curve is the line that represents that flow, and that just shows how this curve below the dam ties into that, because at a certain stage before you get up to that point, the dams would be down, up in that section of the curve the dams are down.

X Q. Tell me how they got dams 2 and 3 down?

A. I think when the water got a certain flow in the river.

X Q. How do you put a fixed dam down?

A. You didn't, if a fixed dam. This is open river.

X Q. Dams 2 and 3 are fixed dams.

A. Yes, sir; this shows a flow in that stretch of the river above the dam.

X Q. Flow under what conditions?

A. Under open river conditions.

839 X Q. And open river conditions means with two fixed dams in place, and one dam below with some wickets dropped; is that right?

A. It might be that.

X Q. Is that a common definition of open river flow?

A. I don't know if I can get you to exactly understand what I mean.

X Q. I think I understand you, but I don't reconcile it with the terminology of open river.

A. Here is what I mean: when the water gets a certain flow in there, those fixed dams are wiped out, as if they were not there, and the upper end of this curve shows that condition.

X Q. What flow was that?

A. That seems to be at gauge fourteen feet up there, it seems.

X Q. What?

A. Gauge fourteen feet.

X Q. Don't you know, Mr. Winn, from your knowledge of this river and your investigation, when you prepared this chart, you can't wipe out fixed dams at any flow shown on this chart?

A. They are wiped out temporarily when your flow gets big enough.

X Q. But no flow shown big enough on this chart, is there?

A. It starts out from zero to fourteen feet,

X Q. to how may second-feet?

A. It don't show—yes; it does. Up at this point it is about 18,000 second-feet.

X Q. Don't you know it to be a fact 18,000 second-feet wouldn't wipe out either of those fixed dams?

A. I have forgotten just what stage they are wiped out.

X Q. You really never investigated that; did you?

A. We did when these were made, but I have forgotten now, without the figures before me.

X Q. Maybe I can help you with one of your exhibits here, Mr. Winn. I now direct your attention to your Exhibit #118, and particularly to dam #2 there near the right-hand end of the exhibit.

840 A. Yes, sir.

X Q. You there show various flood flows. Do any of those flood flows, other than the flood of September 14, 1878, show dam #2 drowned out?

(NOTE.—There was some discussion at this point between counsel and the Court.)

A. It shows they have had some drop.

X Q. That is true then, isn't it, except the flood of 1878?

A. Yes, sir.

X Q. Returning again to Plaintiff's Exhibit 117–a, were there actual stream measurements for the conditions shown or purported to be shown by the curves on Exhibit 117–a?

A. No; except as brought down from Kanawha Falls, or #2 lock.

X Q. Is it fair to say that each of the curves shown on Exhibit #117–a are hypothetical curves?

A. I can only explain that to you by telling you how they were made.

X Q. Well are they curves that have been computed, or are they curves that have been traced from actual measurements of discharge and gauge heights under the conditions supposed to be shown?

A. They were curves computed from discharge measurements at Kanawha Falls and Lock #2 as applied to gauge heights at the points designated on the curves.

X Q. And each of those computations involved assumptions and exercise of judgment; did they not?

A. No; I would not say so, for the discharges shown here you could bring the discharges from Kanawha Falls or Lock #2 down to the point under consideration with pretty good accuracy, and your gauge heights, we have those recorded.

X Q. Well, take your curve for Lock #2, lower pool, and explain how you constructed that curve, I mean Lock #2 lower pool, open river?

A. At open river only applies to the upper end of that curve and not to the lower end.

X Q. Looking at your Exhibit 117-a, what is the curve
841 that drops sharply to the left-hand side of the page below the line labeled "Lock #2 lower pool?"

A. That is the pool showing discharges for certain gauge heights on the lower gauge at Lock #2.

X Q. Open river or what?

A. No; it isn't open river, the open river comes on above that.

X Q. Will you tell me which is the curve that shows Lock #2 open river, where it begins and where it ends?

A. Well it begins down here, right on this line [indicating on exhibit].

X Q. Near figure four?

A. Yes; and follows on up, and here is your lower #2 pool.

X Q. Then it joins that line marked "Lower #2 pool" at about 10,000 second-feet?

A. Yes, sir.

X Q. Then the lower end of that curve is part of your curve or Lock #2 open river; isn't it?

A. Yes, sir.

X Q. How did you get that?

A. By considering it before the dams were built.

X Q. Did you make any measurements before the dams were built?

A. No; simply took them from old charts.

X Q. Did you have any gauge heights?

A. Yes, sir.

X Q. What gauge?

A. At Kanawha Falls.

X Q. Before any dams were built?

A. Yes; I think so.

X Q. What year was it?

A. I don't know. I haven't those things in mind.

X Q. Isn't it a fact the gauge wasn't installed at
842 Kanawha Falls until the dam was built?
A. I can't recall that.
X Q. It may have been, so far as you know?
A. Yes, sir.
X Q. Can you for illustration tell me how you get a specific point on the lower end of the curve Lock #2, open river flow, on the left-hand side of the page?
A. No; I can't tell you right now.
X Q. Was it done under your direction?
A. Yes, sir; and checked at the time.
X Q. Checked with what?
A. With whatever data that was used.
X Q. You don't know what data that was?
A. Not right now, I don't.
X Q. I notice on your chart you have this label "Lock #2 zero flow." How did you get the zero flow at Lock #2; did you measure it?
A. We took the gauge reading when the lowest flow was recorded.
X Q. Did you have any record of zero flow, have any measurements at zero flow?
A. That is what it would have been at zero flow.
X Q. How did you find that out?
A. By taking it with reference to the height of the dam next below, I imagine.
X Q. You don't know that?
A. No; but that is the only way we could have gotten it.
X Q. How would you do that?
A. If you knew the elevation of the height of the dam below level 586.7 the zero flow would have been at that stage.
X Q. But this was an open river flow curve.
A. This is open river with reference to fixed dams.
X Q. Well, then, all right, take your next label, "Lock #3 zero flow"; how did you get that?
843 A. The same way.
X Q. Was there a fixed dam below Lock #3?
A. No; but take it with reference to the crest of the dam next below.
X Q. That was an open river flow curve, too?
A. Yes, sir.
X Q. I thought you said a moment ago that the lower end of your curve, Lock #2, open river, was for conditions before the dams were built; did I misunderstand you on that?
A. That is my recollection of it. I don't know.

X Q. If it were for conditions before the dam was built, you obviously could not have obtained your zero flow by the level of the crest of the dam below, could you?

A. No.

X Q. You had to estimate it in some fashion other than that, didn't you?

A. I imagine it was zero flow. Has reference to zero flow on the gauge of open river.

X Q. Now take for instance Lock #2, zero flow, your label gauge 3.8 elevation 586.7; was that elevation in fact the crest of the dam below?

A. It gives the zero of the flow at elevation 3.8 on the gauge, that is what the zero flow means.

X Q. To get back to your previous explanation that also applied or corresponded with elevation 586.7?

A. Yes, sir.

X Q. What is the elevation of the crest of dam #3?

A. I don't remember.

X Q. Your Exhibit #112 shows it to be 591.7, is that right?

A. I was wrong. This zero flow means flow at zero on that gauge, on the old low water gauge, I imagine.

X Q. Zero on the gauge—your exhibit says the gauge reads 3.8?

844 A. Yes, sir.

X Q. You don't mean what you just say that it corresponded to zero on the gauge, do you?

A. I understand [interrupted].

X Q. Isn't it a fact that you don't know how that zero flow was obtained?

A. No; I don't right now. It has been sometime since this was made.

X Q. Isn't it also a fact that is purely an estimate or guess of someone?

A. It is not a guess.

X Q. There never was any measurements for that condition?

A. I will tell you how we made this [interrupted].

X Q. Just answer my question first.

A. No; there wasn't any flow, I can recall, unless it was held off somewhere above.

X Q. You don't know of any such condition?

A. No.

X Q. And you don't know of any such condition before the dams were built?

A. No, sir.

X Q. And this open river curve as you said was for a condition before the dams were built?

A. I mean this lower end was made from the gauge reading

X Q. Before the dam was built?

A. After the dams were built, the open river is on the upper end and refers to where the two tie on together.

X Q. Awhile ago you told me the lower end was also for open river. Do you want to change that?

A. I said in the beginning the open river referred to only the upper end.

X Q. Later you said the lower end referred to open flow conditions before the dam was built?

A. I didn't mean that. I meant this part of the curve was taken from gauge readings from discharges brought down, from these measurements.

X Q. Was it open river flow?

845 A. Not there.

X Q. With the dams in?

A. Yes, sir.

X Q. And the dams up?

A. The dams are always up.

X Q. Dams 2 and 3 are always up?

A. Yes, sir; that is what we are referring to here.

X Q. That isn't true of #3. You have a curve also for Dam #3?

A. Yes, sir.

X Q. Now, Mr. Winn, you have already pointed out that this curve, the upper end of which, or right-hand end of which, between the designation of Lock #2 open river, at its lower end, diverges, with another line marked upper pool, and the lower one drops sharply below point four on the gauge scale; what is the upper one if the lower one with the sharp drop means Lock #2 lower pool, with the locks or dams up?

A. I just can't recall how that was.

X Q. They can't both represent Lock #2 lower pool with dams in place?

A. Now, I can't recall that.

X Q. Now, you have already said the zero point on this curve is a matter of estimate?

A. Yes, sir.

X Q. Isn't all the rest of that curve a matter of estimate?

A. I can tell you better by telling you how these curves were prepared.

X Q. If you can, I would rather you would answer directly.

A. I would not consider they are a matter of estimates.

X Q. They had to be computed?

A. Yes, sir.

XQ. No actual readings or records from which they could be computed directly?

A. Readings of the gauges and estimate of the flow as brought down from Kanawha Falls.

XQ. But no measurements of stream discharge simul-
846 taneous with the gauge readings?

A. No; I don't suppose so.

By the COURT. Tell us how they were prepared. You have offered to do that, now explain it.

A. If your Honor please, we took periods when the flow was comparatively uniform for different discharges, 1,000, 2,000, or 3,000 second-feet, and so on, for several days, maybe three days or more, and then we had the gauge heights for those periods and plotted the gauge heights as functions of the discharge for those days, just as you plot them from current meter measurements, discharges for certain gauge readings, and then draw a uniform curve on there, supposed to represent the average of all these points that were plotted, and that is what we did here, took different flows at Kanawha Falls and brought them down to the point under consideration and plot those on the chart, then we tried to draw a smooth curve representing the average of all those conditions.

XQ. Mr. Winn, when you do what you have just told his Honor, that is, prepare a rating curve, you actually make measurements, don't you, of stream discharge?

A. Yes; they were made at Kanawha Falls.

XQ. Did you understand me to ask you that? Answer my question, please, and we will get along faster. You make actual measurements and plot them on paper, don't you?

A. Yes, sir.

XQ. And then you draw a smooth curve through actual measurements?

A. Through the group of actual measurements; yes, sir.

XQ. And you have to know the gauge heights as well as the actual measurements of stream discharge, don't you?

A. Yes, sir.

XQ. And they have to be simultaneous, don't they?

Y. Yes, sir.

847 XQ. When you get to the lower end of these curves of Exhibit #117-a, did you in fact have actual gauge measurements?

A. Yes, sir; at Kanawha Falls.

XQ. Did you at the points covered by the charts?

A. No, sir; except Lock #2, we had gauge records there.

XQ. Did you for the open flow condition or when the dams were not in place?

A. No.

X Q. And did you have actual stream or discharge measurements for the lower end of these curves, the low flows shown on this curve Exhibit 117–a, before the #3 dam was built?

A. No.

X Q. Well then, isn't it all estimate for that part of the curve that deals with the conditions before the dam was built?

A. Before the dam was built; yes, sir.

X Q. That is the open river conditions, isn't it?

A. Yes, sir.

X Q. Now, for the purpose of the rating curves you did use in preparing these charts, did you not make the assumption Dams 2 and 3 were tight dams?

A. Didn't make any assumptions.

X Q. Didn't give any consideration to the question of whether dams 2 and 3 were tight or leaky dams?

A. No, sir.

X Q. And of course you didn't give any consideration to what the leakage was if they did leak?

A. No.

X Q. Will you look at your Exhibit 117–a which has on the left-hand side a straight line labeled "london lower pool with Marmet in place," and that intersects with the line Lock #2, or does that intersect with the line Lock #2 open river?

A. Yes, sir.

848 X Q. Now doesn't the wording "London lower pool with Marmet in place" pertain to the curve above the right end of that label and not the line immediately below the label?

A. The line above.

X Q. As a matter of information will you tell me how you developed the curve Lock #3, lower pool?

A. The same way we did the others.

X Q. What was that, did that development of that curve have any relation to the condition of the pool below?

A. It did.

X Q. What was the condition of dam #4?

A. That was taken into consideration, and all the things we plotted in getting the mean.

X Q. What condition did you assume for dam #4?

A. We didn't assume any conditions. We plotted the points and took the median between all of them.

X Q. Wasn't it possible to have considerable variety at dam #4?

A. There was a great variety.

X Q. The dam might be up or down?

A. Yes; or partly up or down.

X Q. And the pool might be exactly at the crest of the dam?

A. Yes, sir.

X Q. And either under or over?

A. Yes, sir.

X Q. What did you assume among all those conditions?

A. As I said we took periods of uniform flow at Lock #3 for instance over a period of several days, that seemed to indicate about the same conditions each day, then we plotted those and got a variety of points plotted, and the ntried to find the smooth curve to get the average of all.

X Q. You plotted a number of conditions and got a variety of results?

A. Yes, sir.

X Q. And then you drew a curve?

849 A. Yes, sir.

X Q. And for what you thought was an average curve?

A. Yes, sir.

X Q. Which may not be true for any actual condition?

A. That is it.

X Q. In other words, if you use that curve, it is not certain you would get a correct answer for any particular condition to which you might wish to apply it?

A. No; supposed to represent average conditions.

X Q. Am I right in understanding from your testimony so far, that for the purpose of the curves on plaintiff's Exhibit #117–a, you did not take into consideration any question of leakage?

A. No; I did not.

X Q. Mr. Winn, I direct your attention to the upper curve, labeled "London lower pool with old Lock #3 in place" and the line intersecting with that curve labeled "Lock #3 normal upper pool, gauge 13.6 Elevation 584.5, and ask you at what peint they intersect; that is, is that at the 2,000 second-feet flow?

A. It is pretty close to that.

X Q. If you follow the ordinate the two lines do intersect approximately on that line, don't they?

A. Lock #3 upper river?

X Q. No. London lower pool with old Lock #3 in place is one curve, and the other line is right below that, bearing the label "Lock #3 normal upper pool."

A. Yes, sir.

X Q. The lines there intersect approximately at the 2,000 level line, do they not?

A. Approximately that.

X Q. For flows lower than that you show the London lower pool dropping below the normal pool, do you not? That is with Lock #3

850 A. I don't get your question, Mr. Jackson.

XQ. Turn your attention to the curve labeled "London lower pool with old Lock #3 in place," does not that curve show the pool level is dropping below the normal upper-pool elevation from the lower reservoir of Lock #3 for flows below 2,000 second-feet?

A. Yes; it goes on down.

XQ. And why is that?

A. I don't exactly get that either, Mr. Jackson. This has reference up here to the London, the new dam, #3 is below that, just below that.

XQ. But it has no reference to the lower pool of the London dam?

A. The normal pool is 584.5 elevation.

XQ. And that is the same as the lower pool of the London dam, isn't it?

A. Now, I have forgotten the elevation of those, but——

XQ. Let's get this straight. If there ever was a time which you have assumed the London dam was in place and dam #3 was in place, then dam #3 was immediately below the London dam, wasn't it?

A. Yes, sir.

XQ. And the upper pool of dam #3 ran up to London dam, didn't it, or backed up to it?

A. Yes, sir.

XQ. And that is the same pool that would be called "London dam lower pool," wouldn't it?

A. Not after #3 was torn out.

XQ. Let's keep on the same place. Your curve is with Lock #3 in place?

A. Oh, yes.

XQ. And under the conditions shown by your chart, the London dam lower pool and dam #3 upper pool is the same pool?

A. Yes, sir.

XQ. Now, I want to know why for flows less than 2,000
851 second-feet your curve shows the London lower pool as dropping below the normal pool level?

A. Well, when they tore that dam out (interrupted).

XQ. Mr. Winn, you can see your curve is without the dam being torn out. Now let's stick to your own hypothesis.

A. I don't know what they could be unless they took into consideration some of those cases when dam #3 leaked and they let it down, I can't see anything else.

XQ. Don't you know what the fact is about that?

A. No, I don't.

X Q. And that was prepared under your direction?

A. Yes, sir. Sometime ago, and I have forgotten.

X Q. I direct your attention to the fact the exhibit says "Revised July 9, 1936."

A. That is with reference to the revision right in here [indicating on exhibit].

X Q. Where?

A. London lower pool with Marmet in place, and based on gauge readings, after the dams were put into operation. These curves were first made before the dams were put into operation.

X Q. The revision was to reflect actual curve conditions and the preceding curves represented estimates of hypothetical conditions?

A. Yes, sir; very small changes.

X Q. The fact is on this curve at "London lower pool with old Lock #3 in place" there could be no explanation of the dropping of that pool level below the normal elevation for London lower pool at flows below 2,000 second-feet, except leakage in dam below exceeding that flow?

A. That is all I can see.

X Q. That is on the basis of your estimates and figures?

A. Yes, sir.

X Q. The leakage at Lock #3 might exceed 2,000 second-feet?

A. Yes, sir.

852 By Mr. JACKSON:

Q. Now, Mr. Winn, I want to ask you a question or two in regard to Exhibit 117–b.

A. That is four and five and Marmet.

Q. That purports to show the reading of the curves for locks 4 and 5 and Marmet on the Kanawha River?

A. Yes, sir.

Q. A number of curves on your Exhibit 117–b purports to reflect certain conditions with Locks 4 and 5 in place. Are Locks 4 and 5 in existence?

A. No, sir.

Q. Is it not a fact that the locks and dams four and five on the Kanawha River have been removed for a considerable period of time?

A. I think so; yes, sir.

Q. And they have been replaced by the Marmet Dam?

A. Yes, sir. No. 5 is below the Marmet Dam; yes, it was really replaced by the Marmet Dam.

Q. So that insofar as Exhibit 117–b deals with conditions alleged to exist, with reference to dams and locks 4 and 5 on the Kanawha River, it deals with a nonexistent condition?

A. Yes, sir.

By Mr. JACKSON. I judge the Court will receive it, but I should like to make a motion to exclude all evidence on Exhibit 117–b relating to locks 4 and 5 on the ground that the condition does not now exist and has not existed since this lawsuit commenced.

By the COURT. I will admit it because it might have some evidential value as showing the condition of the flow and water supply in that stream and while it might be remote, it might have some evidential value.

By Mr. JACKSON. I do not wish to argue the point, but would like to make this observation in explanation of my objection, and that is, I assume that any rights of the Government must be based upon injury under actual conditions, and that we are not going by what were the conditions or what were not the conditions in 1878 or 1918, or 1925, but what the conditions are under which the Court is asked to issue the injunction.

By the COURT. Yes; that is true. However, the whole condition or the various conditions might have some bearing as evidential value or might tend to have some evidential value.

By Mr. JACKSON. I just want to make the record up on that point, so that our position may be clear. And we desire to take an exception to the ruling of the Court.

By the COURT:

Q. Mr. Winn, the Marmet Dam is the first one above Charleston?

A. Yes, sir.

By Mr. JACKSON:

Q. I now want to direct your attention to the curve on Exhibit 117–b marked "Marmet with Winfield Dam in place." That, of course, deals with a condition that has never existed, does it not?

A. Yes, sir.

Q. And naturally the curve is a result of a computation or estimate?

A. Yes, sir.

Q. You will observe as you approach the left hand side of the chart, Exhibit 117–b, the curve separates with one line dropping sharply and the other proceeding at a moderate decline
853 towards the left side of the exhibit?

A. Yes, sir.

Q. What is the line that drops sharply?

A. That is with Marmet and Winfield Dam in place.

Q. What is the one that does not drop sharply?

A. Marmet with Pool No. 6.

Q. Read the question to the witness. (Question read to the witness.)

A. I see what you mean now. I was reading it wrong. I take it that No. 1 is the condition before the Winfield Dam was in place,

and the other one that comes down there will be as it will be when the Winfield Dam is put in.

Q. Do you know anything about it?

A. Not right now, I do not.

Q. There is certainly nothing on the exhibit to indicate that the line with the less sharp decline is the condition before the Winfield Dam is in place, is there?

A. No, sir, but this other one is the one with the Winfield Dam in place.

Q. You mean the one that drops sharply?

A. Yes, sir.

Q. Now, take the next curve which is marked "Marmet, 1935, with Pool No. 6," which also diverges towards the left-hand side of the chart, with one of the diverging lines dropping sharply towards the ordinate on the left-hand edge of the exhibit. Please explain what the curve and the two diverging ends of it mean.

A. As I recall it, that top line, which is more or less straight, represents conditions with Pool No. 6. Wait a minute. I take it that straight line above there is open-river conditions, and this other shows with Pool No. 6.

Q. Is there anything on your exhibit to support your statement that it is open-river conditions?

854 A. No, sir; there is not, but this I know represents the discharge for different gauge heights below the dam with No. 6 in place, and this one represents it with Winfield in place.

Q. What do you mean by "This"?

A. Marmet with No. 6, where it drops down this way [indicating].

Q. You mean sharply?

A. Yes, sir. That is with reference to No. 6 in place, and this other one is with Winfield in place.

Q. I see that you state "The other one," referring now to the upper curve?

A. Yes, sir.

Q. When you said "The other one," which means with Winfield in place, are you referring to the top curve that I asked you about a little while ago?

A. Yes, sir.

Q. That is the one labeled "Marmet with Winfield Dam in place?"

A. Yes, sir.

Q. Did you state what was meant by the straight line there and "Marmet with Pool No. 6?"

A. I think that is with open river. It shows the use of the river here, No. 5 and No. 6, and I think all those straight lines are open river and the others where it drops off.

Q. Referring to your curve, Lock 5 open river, and Lock No. 4, open river, will you state as briefly as you can what was meant by open river for the purpose and the assumptions which you made in preparing these curves.

A. Those straight lines there represent open river, that is, without any dams in place, and the curve showed what effect the dam had.

Q. You say curves, you mean the ends of these curves that diverge and drop sharply to this lower left-hand corner of the exhibit?

A. Yes, sir.

855 Q. I am still not quite clear in regard to your statement as to dams for Locks No. 4 and No. 5, open river. What dams were down?

A. I assume they were all down and that would establish open river conditions.

Q. That is, all the dams below either dam 4 or 5 were down?

A. Yes, sir.

Q. That is a condition that never existed when any of the measurements which you used were taken, is it not?

A. I don't know. I think they probably were down and a lot of those measurements were brought down from Kanawha Falls

Q. Do you know anything about that?

A. Yes, sir; I think that is what happened.

Q. What period of time was that?

A. I couldn't give you that off-hand.

Q. Now, Mr. Winn, I want to direct your attention to the sharply curving part of the upper curve, Marmet with Winfield Dam in place, and the sharply curving part of the second curve entitled: "Marmet, 1935, with Pool No. 6," which you have said in each instance represents the open flow conditions.

A. Yes, sir.

Q. Or dams in place conditions?

A. Yes, sir.

Q. Why do those curves, which represent respectively condition "Marmet with Winfield Dam in place" and "Marmet, 1935, with Pool No. 6 in place" come together at about a point six or seven hundred second-feet flow or about a thousand second-feet flow?

A. Because at low stage there wouldn't be any difference, or it wouldn't make much difference whether you take it from No. 6 or from Winfield, as I take it.

Q. Do No. 6 and Winfield have the same normal pool level?

A. No, sir; they have a different one where they come together. The Winfield will have 2.85 hundredths greater elevation than No. 6.

856 Q. You would not expect Marmet, with Winfield in place, and No. 6 in place to coincide anywhere, would you?

A. Let me see now. I don't know whether that is right or not. No, I would not, that looks like it is wrong, I cannot explain it.

Q. I direct your attention to the curve of Lock No. 4, lower pool, and ask you whether that curve does not show a drop below the normal pool level for flows of perhaps one thousand second-feet or less?

A. That is for No. 4?

Q. Yes.

A. Yes, sir; it seems to.

Q. What is the explanation of that?

A. I don't know, unless some of the records showed it dropped below the crest of the dam at No. 5, or went below the normal pool. If it went enough below it would draw it down below the normal pool.

Q. What would make it go below the normal pool with a flow of one thousand second-feet?

A. If the dam was down it would go way below.

857 Q. Is the dam down on this curve?

A. It don't show it, no, sir. It is possible it could be drawn down below normal pool considerably and usually is when they get a low flow.

Q. As a matter of fact, would they ever put a dam down with a flow of thousand second-feet, or less, in the river, unless it was necessary to make necessary repairs?

A. No, sir; I don't think so, with that much flow, or for repairs or maybe leakage.

Q. Do you think a record or any chart which reflected that condition, when the dam was down during low water flow for repairs, is representative?

A. This is down to zero flow, you will notice that?

Q. Read the question. Do you think a record or any chart which reflected that condition, when the dam was down during low water flow for repairs, is representative, or typical?

A. I don't think that means much, thousand second-feet flow.

Q. You can answer my question directly, can't you?

A. Yes; I say it does not reflect the probable conditions.

Q. Were your curves intended to reflect the usual or ordinary condition or unusual condition?

A. Down to the low water flow of the river, down to the thousand second-feet we did try to represent actual conditions; beyond that it did not matter much, but it is just a hypothetical case, and if it went below that it would come out as shown.

Q. Your understanding is that the part of this chart that carries the curves down below a thousand second-feet doesn't amount to much?

A. Not unless the water was shut off above, and it got down to that.

Q. If the dam were down, how could the pool elevation be two-tenths below normal on that curve?

858 A. On this curve here [indicating]?

Q. Yes, sir.

A. The dam might not be down, but if the water was shut off above it would drop down to that two-tenths of a foot.

Q. What would cause it to drop below the pool level?

A. Shutting the water flow off. This showed zero flow. If you shut all the water off, and there is no flow, it would drop down to that.

Q. Don't you think the leakage in the dam might have something to do with it?

A. It might, but that still would not be zero flow at the upper end.

Q. But you understand that your chart began at thousand second-feet and not at zero.

A. As I understand you are talking beyond where it goes below normal pool?

Q. It starts at a thousand second-feet?

A. Yes, sir; it starts at a thousand second-feet.

Q. And it goes from there down to zero?

A. Yes, sir.

Q. Now, another question in regard to Exhibit 117-b. Mr. Winn, I want to direct your attention to the curve which drops sharply at the lower left-hand corner of the exhibit, for illustration the curve dropping from the one labeled "Lock No. 4 Open River" and will ask you how you obtained the point which you used to plat those curves at the lower end of the curve.

A. By gauge readings of the flows from Kanawha Falls and No. 2.

Q. That is, you computed the point from certain gauge readings that you had at Kanawha Falls?

A. Yes, sir.

Q. You had no gauge readings at Locks 4 and 5, did you?

A. Yes, sir; there is where we got the gauge readings, and we got the flow from Kanawha Falls.

859 Q. And you computed the flows from data at Kanawha Falls?

A. Yes, sir.

Q. So that we may check these matters, will you tell me the date when the conditions which you describe at Lock 4, Low Water Gauge 4.64 occurred?

A. No, sir; I cannot tell you.

Q. Can you look it up and supply it later on?

A. Yes, sir.

Q. Will you do that also for the next one, Lock 5, Low Water Gauge 3.72?

A. Yes, sir.

Q. I think you have two similar annotations, three in fact, on your Exhibit 117–a?

A. Yes, sir.

Q. At the same time will you give us the date and reference to any editions of the Water Supply Paper from which you obtained those figures?

A. Yes, sir; I will.

By Mr. JACKSON:

Q. Just before recess I asked you to obtain and produce dates of the gauge readings shown on Exhibit 117–b. I understand from you that during the recess you have refreshed your recollection as to the date of these readings on Exhibit 117–b, designated as "Lock No. 4, Low Water Gauge 4.64; Lock No. 5, Low Water Gauge 3.72." Am I right in understanding that?

A. Yes, sir.

Q. Are those readings for the low water of 1879?

A. Yes, sir.

Q. Isn't it a fact that there were no discharge measurements in 1879 for those gauge readings?

A. I don't know as to that, if there have been a number of occasions——

Q. One moment.

A. I will have to explain my answer, if I am permitted to do so.

860 A. There have been a number of occasions where measurements made at a later date were referred to gage heights for previous flows.

By Mr. JACKSON:

Q. But you don't know of any measurements made for the gauge heights of 1879, do you?

A. I do not.

Q. Now, on your Exhibit 117–b you have this, "Gauge reading at low water of 1879 platted for a flow at thousand second-feet."

A. At No. 5?

Q. Yes, sir.

A. Yes, both of them are platted.

Q. For a flow of thousand second-feet?

A. Yes, sir.

Q. I direct your attention to page 85 of Water Supply Paper 536, one of the Government exhibit, I have forgotten the number, and ask you whether that does not show in the second column a

minimum discharge for 1879 of one thousand five hundred and forty second-feet at Kanawha Falls. It is checked with a pencil mark for your convenience.

A. Yes, sir; I see that.

Q. Is it a fact that that Water Supply Paper does show a minimum flow at Kanawha Falls for 1879 of fifteen hundred and forty (1,540) second-feet?

A. Yes, sir; that seems to be it.

Q. And Kanawha Falls is upstream from the point from which you show a flow of thousand second-feet on your chart?

A. Yes, sir.

By Mr. JACKSON. The Water Supply paper which I have just shown the witness is Gove ment Exhibit No. 68.

A. I would like to state that I don't know that the Water Supply Paper was used for that low water flow. They had a certain gage height, and according to the Lock 2 rating curve it might have been one thousand second-feet, instead of fifteen hundred and forty second-feet.

Q. You do know, from your inspection of your Exhibit 117–b, that the flow shown on page 85 of Government Exhibit No. 68 was not used, that is a thousand second-feet?

861 A. No, sir.

Q. You don't know where the thousand feet came from, do you?

A. No, sir; I do not.

Q. I would like to ask you a question or two about your Exhibit 117–c which you have before you?

A. Yes, sir.

Q. Am I right in understanding that that exhibit purports to give ratings curves for Locks 6, 7, and 8 on the Kanawha River?

A. Yes, sir.

Q. Isn't it a fact that Locks and Dams 6, 7, and 8 on the Kanawha River will be superseded by the Winfield Dam?

A. Yes, sir.

Q. And isn't it a fact that the Winfield Dam is now under construction?

A. It is.

Q. Isn't it a fact that the Winfield Dam will be completed at least by the autumn of 1937?

A. I think that is the schedule.

By Mr. JACKSON. May I have the record show a motion to exclude the curves relating to Locks 6, 7, and 8 on the ground that it appears that those dams will no longer be in existence at the time when the Government asks the Court to grant an injunction, which I presume the Court will overrule.

By the COURT. Yes.

By Mr. JACKSON. I am making this motion purely for the record.

Q. Now, will you tell me as briefly as you can why you assumed open river conditions for the purpose of curves for Locks 6, 7, and 8?

A. For the reason there were no dams there or that they were all down.

Q. You drew no distinction between conditions where the dams below each of these locks were all down and where there were no dams whatever in the stream?

A. I don't think so; no.

Q. I direct your attention to the upper curve on Exhibit 117-c, designated "Lock 8, Open River," and ask you to state what is meant by the two diverging branches, curved at the left-hand side of the chart; I want to know what each of those branches represent.

A. One represents open river and the other one is the dam in place.

Q. Which represents the open river?

862 A. The upper one.

Q. The one which has a relatively low rate of decline?

A. Yes, sir.

Q. That represents the open river?

A. Yes, sir.

Q. And the branch which drops very sharply to the lower left-hand corner is with all dams in place?

A. Yes, sir.

Q. Now, similarly, was the curve for Locks 6 and 7, diverging towards the left-hand side of the Exhibit, with one branch proceeding with a low rate decline, and with one branch dropping rapidly?

A. Yes, sir.

Q. In each of those cases does the more nearly straight or horizontal line represent the open flow, and in each case the rapidly dropping the line condition, with all dams below in place?

A. Yes, sir.

Q. I assume what you have said before with respect to these other charts is applicable here, that is, that you don't know the conditions of the dams below, nor whether they were assumed to be in place; and with reference to leakage or wickets, condition of construction, or anything of that kind; I assume that what you have stated with respect to the other chart is applicable here.

A. That is correct.

Q. Similarly each of these curves is computed—that is, no one of these curves is based upon actual gauge records, plus simul-

taneous discharge measurements for the conditions purported to be shown by these curves?

A. Not at that point the curve is drawn.

Q. They are all built-up curves?

A. Yes, sir; they are curves built up from flows at Kanawha Falls on No. 2.

Q. Do any of these curves rest upon simultaneous gauge
863 readings and discharge measurements made actually?

A. I don't know of any.

Q. I direct your attention to the more nearly horizontal portion of the upper curve, Lock 8, open river, and I ask you whether or not the lower left hand end of that curve shows any leakage?

A. No, there is nothing there to indicate any leakage, no, sir.

Q. Do you know that the dam which maintained the pool was free from leakage?

A. I do not.

Q. If, in fact, the dam maintaining that pool was subject to leakage during the period the records upon which it rests indicates, the curve would be in error, wouldn't it?

A. I could not answer that yes or not.

Q. Then answer it the fairest way you can answer it.

A. I told you the way we made the curves—just as if we had current meter measurements; we referred to certain gauge heights.

Q. But you didn't have any, did you?

A. We did not, but we had some that we considered good during low flow periods, and the liability of error in bringing the flow down to the lower locks is very small, and I would consider that we had pretty close approximations to local current meter measurements.

Q. You don't know whether or not any of these dams, 6, 7, or No. 8, leak, do you?

A. No; I do not.

Q. You don't know whether or not any leakage to which they were subject varied from time to time?

A. I could not say definitely.

Q. And you don't know whether or not such leakage as may have existed at the three dams was synchronized as to the condition between the dams. Was there always maintained a constant relationship between the dams?

A. No, sir; I could not say that.

864 Q. The ratio between the leakage in two of these dams might vary from time to time?

A. Certainly.

Q. And your curves do not take that into consideration, do they?

A. No; not directly.

Q. You do not have any records of those leakages?
A. No, sir.
Q. And you did not study leakage?
A. No, sir.
Q. But you do know as a fact that all wicket-type dams leak, more or less?
A. All I ever saw did; yes, sir.
Q. You know that, as an engineer?
A. Yes, sir.
Q. On Exhibit No. 117–c, you show six items of low-water gauge readings. Do you find them?
A. Yes, sir.
Q. The first is Lock 8, low-water gauge 527?
A. Yes, sir.
Q. Were these readings obtained in the same way as the ones for Exhibit "D," about which you testified awhile ago?
A. I am not sure. I can look at the charts and tell.
Q. You yourself are not able to say whether or not they were based on the low-water flow of 1879?
A. No, sir.
Q. In each instance, your chart shows 1,000 second-feet?
A. Yes, sir.
Q. As a matter of fact, that low-water flow at Lock 8, seems to be the same as at Lock 2?
A. It might be.
Q. Is it ordinarily?
865 A. For extreme cases, I would say it is pretty close to it. So close you could not make any distinction on this chart.
Q. If the chart—a variation between 1,000 and 1,100 second-feet to 1,500 second-feet, you would show that on this chart?
A. Yes, sir.
Q. Will you supply us later, Mr. Winn, the dates for which those gauge readings were obtained, shown on your Exhibit 117–c, together with the official publication in which they appear?
A. Yes, sir.
Q. You show at the bottom some zero flow—are these estimated flows the same as in the case of the exhibits about which you have just testified?
A. Yes, sir; I think so.
Q. Turn to Exhibit 117–d, am I right in understanding that this exhibit purports to show rating curves of Locks 9 and Winfield?
A. Yes, sir.
Q. Is it not a fact that the Gallipolis dam on the Ohio River will supersede dam No. 9?
A. Yes, sir.

By Mr. JACKSON:

Q. State whether or not that Gallipolis dam will be completed late in 1936, or in early 1937?

A. Late in 1937.

Q. Late in 1937?

A. That is the schedule; it depends on the condition as to whether or not that will be fulfilled.

By Mr. JACKSON. I ask that the record show a motion to exclude data with reference to Lock No. 9, on the ground that it will be superseded, and ask for the Court's ruling, and have our exception noted.

By the COURT. All right. The motion is overruled and your exception is allowed.

By Mr. JACKSON:

Q. Mr. Winn, you have one curve labeled Winfield site, average open river. What is meant by that?

A. That was the average for open river conditions. It varies with different gauge heights, you know.

Q. That is, it might not be true for every particular condition——

A. Yes, sir.

Q. (Continuing) To which you might seek to apply it?

866 A. Yes, sir.

Q. Can you state just briefly what were the conditions considered in making up the average of open-river conditions?

A. As I recall, it depends on the back-water condition from the Ohio River. No, that would not be right. No; I cannot state that without reference to our notes.

Q. This was also made under your supervision, was it?

A. Yes, sir.

Q. In the lower hight-hand corner, it indicates it was made July 8th, 1936; is that correct?

A. Yes.

Q. I mean your right-hand corner?

A. Yes, sir.

Q. But you are not able to tell the Court what conditions, the variable conditions that were considered in arriving at the average open-river stage?

A. One is the average, and the upper one is for the minimum conditions of both streams.

Q. I am asking you for the variable conditions that entered into the determination of the average open river?

A. That would be—let's see if I can state that. The upper one is lower pool minimum elevation; that is, the least elevation you can get with no back-water effect from the Ohio River, but if we

had a big tremendous flow from the Ohio, it would back up to Winfield, and that would give what the average conditions will be—that is, the average condition of the Ohio and the average conditions of the Kanawha River.

Q. They are the back-water conditions—the average back-water conditions?

A. The average conditions of flow, taking them from the rating curves of both rivers.

Q. Well, isn't it a fact that, for any given flow, as much as 6,000 or 8,000 second-feet, you can have any number of conditions on the Ohio?

867 A. You might have; it is a variable condition.

Q. Very much so over different conditions?

A. Yes, sir.

Q. And the same would be true on the Kanawha River?

A. Yes, sir; but I will say this——

Q. Now, Mr. Winn——

By the WITNESS (continuing). That with the Gallipolis dam built, the effect of the back water up to the mouth of the Kanawha River is very small, even with 150,000 second-feet flowing in the Ohio; it comes up very small.

Q. Do your curves here deal with conditions with the Gallipolis dam in operation—Exhibit 117-d?

A. Yes, no—yes. It don't deal with that yet.

Q. No, sir; you can lay that to one side.

A. Yes, sir.

Q. Unless you knew the simultaneous conditions in the Ohio River and the Kanawha River, having in mind the great number of variations which you have already referred to, how can you compute an average open-river condition for Winfield site?

A. Just by plotting, as I showed you, a great number of points and getting a median line.

Q. Of course.

A. That is the way this was done.

Q. I understand the mechanics of it, but you could not be sure which result is applicable to any thing——

A. (Interrupting.) No, sir.

Q. (Continuing.) Unless you knew you were plotting comparable conditions on the two rivers?

A. No, sir; all we can show is average conditions.

Q. Where is the scale for Lock 9, the gauge height of Exhibit 117-d?

A. I don't believe it shows it.

Q. Do you know what the scale is for that?

868 A. No; I don't know, except that it drops to zero on the gauge, and you can take it from that.

. Is it possible for one to read the chart without having a scale?
. No; you would have to figure it.
. That is the copy that you said an engineer could read that understand it.
y Mr. McCLERNAN. Can I clarify that?
. Can you determine the scale from an inspection and compu-on on the exhibit alone?
. Yes, sir.

By Mr. JACKSON:

. Tell us what the scale is.
. You have to figure that. You have the zero gauge and then get the elevation. The elevation is along in here [indicating]. figure the discharges and get the elevation.
. Where is the gauge height that corresponds to the discharge ock 9 curve?
. I haven't got that; it does not show it. I will take that back. hows zero and discharges for ——
. You have on the lower left-hand corner of this chart "Zero flow Winfield gauge 2.5?"

A. Yes, sir.

Q. What is the basis for that information?

. I don't recall that.
. Will you look it up and give us the dates of the readings?
. Yes, sir; this was determined as shown on the gauges at ks 8 and 9, because there was no gauge at Winfield probably at time, and this zero was given.
. This is an estimated gauge height at Winfield site?
. Yes, sir.
. Of course, in fact, there was never a zero flow at Winfield to be measured?
. No, sir.
. Mr. Winn, will you look at your upper curve of the chart, ranch of which is labeled "Lower pool minimum elevation," the lower branch Winfield site average open river flow, and me at what flow they come together?
. They come together at about 20,000 second-feet.
. Does that mean that the back water effect of the Gallipolis on Winfield disappears at 21,000 second-feet flow?
. No, sir; but that would have to come into the same elevation pen river flow at that point and above that, it would only come pen river.
. It doesn't include some back water effect above that?
. Above that?
. Yes.
. No, sir; it was just average open river flow.

Q. Does the curve show where the back water effect of Gallipolis dam disappears?

A. No, sir.

Q. According to this chart, in this lower branch of the curve, Winfield has the average open river flow. As to the open river flow at Winfield, doesn't the Gallipolis dam effect that flow
870 at 21,000 second-feet?

A. No, sir.

Q. Doesn't it affect the gauge at all?

A. At 21,000 second-feet on the Kanawha River, it might; yes, sir.

Q. Your chart does not show that, does it?

A. No, sir; it just says average open river conditions.

Q. From your study and working up these curves, don't you know it to be a fact that the back-water effect of Gallipolis dam affects the Winfield site for flows of at least 100,000 second-feet at Winfield?

A. This is 100,000 second-feet to Winfield?

Q. Yes.

A. I could not answer that right off.

Q. That would mean at least 100,000 second-feet at Gallipolis, if it had 100,000 at Winfield?

A. Yes, sir; a flow of 100,000 at Gallipolis has little back-water effect at the mouth of Kanawha River, and at 175,000 second-feet flow at Gallipolis, the dams are raised and has no effect on Kanawha River.

Q. Mr. Winn, I don't suppose you now have it, but will you supply us with the data as to the minimum elevations to which your chart refers, in connection with the upper curve on Exhibit 117-D—as to the lower pool minimum elevation on the upper curve?

A. Zero—oh, the upper curve. I don't see that particular place on this.

Q. Your curves read lower pool minimum elevation?

A. Yes, sir.

Q. Will you supply those minimum elevations?

A. I can tell you now what that was. We picked out the minimum flow of Kanawha River from the rating curve, and then we took these others, 6, 8, and 10,000 second-feet, and checked off the flow duration curve of the Ohio River at some point in percent of time, and this was the curve produced by using those.

Q. Wouldn't these be the average elevations rather than the minimum?

871 A. No; at that time, no—that is the minimum on each stream. The average might be larger.

Q. I will ask that the last question and answer be read. (The last question and answer are read.) Mr. Winn, I have here a chart labeled Corps of Engineers, United States Army, Ohio and Kanawha Rivers, Gallipolis to Winfield Locks, back-water profiles, dated August 12th, 1932, and ask you to examine it and state whether or not, from that chart, you can, whether you can refresh your memory as to the back-water effect of a flow of 150,000 second-feet at Gallipolis upon Winfield, at the mouth of the Kanawha rather, upon Winfield—that is, the effect due to the Gallipolis dam.

A. This is the latest one, but that does show some effect.

Q. How much?

A. 100,000 second-feet at Point Pleasant; 100,000 was about 1.4 feet.

Q. Where, at the mouth of the Kanawha River?

A. At the mouth of the Kanawha River.

Q. What flow was that?

A. 100,000 second-feet.

Q. How about 150,000 second-feet?

A. It doesn't give 150,000, but it gives 192,000, and goes away up to——

Q. To what?

A. The dam would be up at that time, so there would be open river conditions and there would be no back water due to the dam. There would be back water in the Kanawha River.

Q. It would not be open at 150,000?

A. Not altogether—at 175,000.

Q. And the back-water effect at 150,000 would be substantially more than 100,000, at the mouth of Kanawha, would it?

A. It would come up, yes, sir; 100,000 would have back-water effect.

Q. 150,000 would have substantially a greater back-water effect?

A. Yes, sir.

872 Q. Was your answer, did you say 4 feet?

A. As I recall, our latest figure shows there was a back-water effect at the mouth of the river, at 150,000 second-feet flow, it would be slightly in excess of three feet. I had heard it was three-feet-pool elevation and, when we got to the mouth of Kanawha River, we didn't expect that.

Q. I now want to ask you a question or two about your Exhibit 117-e. Am I right in understanding that the exhibit shows the purported rating curves for Kenawha River at Locks 10 and 11.

A. Yes, sir.

Q. And is it not a fact that the Gallipolis dam will supersede both locks 10 and 11?

A. Yes, sir.

By Mr. JACKSON. May the record show a similar motion for the exclusion of this and the ruling of the Court and our exception noted?

By the COURT. Yes, sir. The motion is overruled, and you except and your exception is granted.

By Mr. JACKSON:

Q. Now, referring to your first curve of Lock 11, the lower pool. Upon what rates of flow on the Ohio is that based?

A. The same as the one I spoke to you about. Points of different flows in the Kanawha River at the percent of time they occur, and get the flow that occurs there the same percent of time as in the Ohio.

Q. That is, this curve is based upon the length of time and average conditions?

A. Yes, sir.

Q. And that average is a kind of a process that we are talking about as to Exhibit 117-d?

A. Yes, sir.

Q. For open-river average conditions?

A. Yes, sir.

Q. There are, of course, wide departures from that average?

A. Yes, sir.

Q. The same situation exists with reference to the other curve of Exhibit 117-e, labeled Lock No. 10, lower pool?

A. Yes, sir.

873 Q. Now, the curve to Lock 10, lower pool, is that based on the assumption that Lock 11 on the Kanawha did not leak?

A. No, we did not take that into consideration, as to whether or not it leaked or not.

Q. As in the other exhibits, about which you have testified, you gave the leakage and the variation in the leakage no consideration in preparing these curves?

A. We did not.

Q. Referring to curve Lock 11, lower pool, is the situation the same with reference to the controlling effect of dam 26 on the Ohio? That is, the question of leakage was not considered?

A. Yes, sir.

Q. You will notice that the curve, Lock 10, open river, separates towards the left-hand side and the upper part is marked Lock 11, lower pool, and the lower branch is not designated?

A. Lock 11, lower pool, just refers to that part of the curve below open river. It should be down here.

Q. It was, as in other cases, you did not have actual gauge readings and simultaneous discharge measurements, but the curves are the result of computation?

A. Yes, sir.

Q. I was asking about the curve marked 10.

A. Oh, I see.

Q. And the lower part of that lower branch of that curve at the left hand side does not appear to be labeled?

A. Yes, sir.

Q. I want to be sure what it represents is all?

A. I take that to be the discharges and the gauge heights just below the dam.

Q. Under what conditions?

A. Under conditions with the dam up.

Q. That is, with dam 11 up?

A. Yes, sir.

874 Q. You have, on the lower left-hand corner, several entries showing certain gauge readings, low water?

A. Yes, sir.

Q. I assume you don't remember just the date of those readings. Will you supply to use the dates of each gauge reading, together with reference to the official publication from which you obtained them?

A. Yes, sir. If you will give me a memorandum of those, so I will not forget it. All except the first sheet, I think.

Q. I went back to the first sheet later and asked about those?

A. We have got some of those.

Q. Yes, sir; that is all right. Will you turn to your Exhibit 117-f?

A. I do not have it. [Paper is supplied to the witness.]

Q. Am I right in understanding that Exhibit 117-f purports to show rating curves for Gallipolis dam and dam 26?

A. Yes, sir.

Q. On the Ohio River?

A. Yes, sir.

Q. Isn't it a fact that Gallipolis dam will supersede dam 26?

A. Yes, sir.

By Mr. JACKSON. May I ask that the record show our motion to exclude the data with reference to dam 26 on the Ohio River and the ruling of the Court and that the exception is allowed?

By the COURT. Yes, sir.

By Mr. JACKSON:

Q. Will you explain the basis and method of plotting the curve designated Gallipolis dam and supply us——

A. (Interrupting.) Shall I explain this?

Q. Yes. Do you want the question read?

A. No, sir. This top curve shows the effect just below the junction of the two rivers—the different flows after the Gallipolis dam is built, say for 100,000 second-feet, it shows how much it will be in discharge in elevation.

Q. In elevation?

A. Yes, sir.

Q. What I asked for was not what it showed, but the basis upon which you had plotted; what data had been used?

875 A. From back water studies, we made to show what effect backwater would be up there.

Q. That was purely——

A. (Interrupting.) Backwater above the dam.

Q. That was purely a hypothetical study, was it?

A. They were computed flows; yes, sir.

Q. They were studies for the hypothetical condition?

A. Yes, sir.

Q. It has never existed and never been measured or determined?

A. Yes, sir; that is right.

Q. I showed you awhile ago a chart on backwater effect, which had been prepared in the District Engineer's Office?

A. Yes, sir.

Q. Were they based on data shown in that chart?

A. I don't think they are comparable at all; no, sir.

Q. Was that based on any published document?

A. No, sir; just office studies.

Q. Well, this curve is based upon studies which were made for the purpose of preparing an exhibit to be used in this law suit?

A. No, sir; they were studies made as to the effect of backwater above the Gallipolis dam, to know what floodage of lands we would have to buy. That is primarily what was shown.

Q. Is that the reason that the curve refers to dam 26, to determine what lands you would have to buy for the Gallipolis dam?

A. No, sir; that was just to determine the effect it would have, after the Gallipolis dam was built, what effect it would be at No. 26.

Q. These two curves on Exhibit 117–f were prepared for use in this suit, were they?

A. Yes, sir.

Q. And not for use in any routine business in the engineer's office?

A. No, sir.

Q. You have shown in the lower left hand corner a zero

876 flow elevation 508. How was that determined?

A. I don't remember just where that came from.

Q. That was not based on any actual measurement, of course?
A. It was based on gauge readings.
Q. Not gauge readings actual zero flow, of course?
A. No, sir.
Q. You mean simply that it was estimated?
A. Yes, sir.
Q. By some kind of gauge reading?
A. Yes, sir.
Q. Will you supply, if you do not have it now, the low water at #26 and elevation 530.15?
A. That was taken from the Ohio River chart, and these charts were plotted there and the survey made for the complete canalization of the Ohio River.
Q. Give us the name of the official publication. Can you do so?
A. I can give you the name of the paper; yes, sir.
Q. Your survey was in low water; is that correct?
A. No, sir; just in different cases, in high water, too, at various places.
Q. You don't know the date of low water, then?
A. No, sir.
Q. Are you able to furnish it?
A. I don't know if I can. We took charts. They were prepared in the Louisville District office and we took them as the official records.
Q. How do you know whether they are correct?
A. As and except as shown by the official record.
Q. And you will give us the citation of that record?
A. Yes, sir.
Q. Look at the lower branch of the curve, dam 26, and tell me how you arrived at that sharp curve at the lower left-hand mark?
A. It was plotted from open river gauge readings or gauge heights.
877 Q. They were not actual measurements?
A. No, sir.
Q. That was estimated?
A. Yes, sir.
Q. In some fashion?
A. Yes, sir.
Q. Mr. Winn, for a moment I wish to direct your attention to your Exhibits 113 and 114. Am I right in understanding that your Exhibit 113 is a stage graph of the gauge readings at Galax, Ivanhoe, Allisonia, Glen Lyn, Caperton, Kanawha Falls, the Greenbrier at Alderson and Gauley River at Belva for the period July 1, 1932, to August 31, 1932?
A. Yes; you left off Eggleston. Isn't it on there?

Q. Yes; I should have included Eggleston.

A. Yes.

Q. Exhibit 114 is a graph of the stage of the gauges at the same stations for the period July and August 1930; is that right?

A. I don't believe there are as many gauging stations on that one as the other.

Q. Exhibit 114 has only the gauging stations at Galax, Ivanhoe, Allisonia, Eggleston, Glen Lyn, Caperton, Gauley River at Belva, Kanawha River at Kanawha Falls?

A. There is one left off.

Q. The Greenbrier at Alderson is left off?

A. Yes.

Q. The labels on these exhibits 113 and 114 describe them as hydrographs. They are really simply stage graphs of the stages of the gauges, are they not?

A. Yes.

Q. They show merely the height of the gauges and do not show the rate of flow?

A. Yes; there is one of them where the rates of flow were put on there at points.

878 Q. 113 and 114?

A. Yes; one of them. They are not averages. They were picked off of the rating curves for those particular points shown there. The published record would show daily averages and we just simply put in some flows picked off of the rating curves for those particular places and those particular times that are shown there.

Q. These exhibits 113 and 114 are based upon chart records at the various gauging stations; is that right?

A. Yes, sir.

Q. And they are not under your jurisdiction, of course?

A. No. We got prints from the United States Geological Survey Engineers and simply transferred them to this sheet here.

Q. But you yourself cannot vouch for those records or the corrections that were made or the conditions under which the gaugings were taken?

A. No.

Q. You don't know whether any corrections were applied to the charts or whether any were needed?

A. They were. Nearly all of those charts will have some minor corrections and they were made before they were transferred to these sheets.

Q. Those corrections you know nothing about except that they appeared on the chart as it came to you?

A. That is all.

Q. These stage graphs were then copied from a blue print or
otostat furnished you by the United States Geological Survey?
A. Yes, traced right from that tracing from which this was
ade.

By Mr. JACKSON:

Q. Who asked to have these exhibits 113 and 114 made?
A. Col. Watkins, I think.
Q. And who supplied you the records from which you made
em?
A. Mr. Kessler for the State of West Virginia and Mr. Dirzu-
laitis for the State of Virginia, District Engineers for the
9 United States Geological Survey. We have the blue prints
they sent us and will be glad to send them in. I don't see
y objection to that.

By Mr. JACKSON:

Q. As to these figures for rate of flow which appear occasionally
Exhibit 114, do you know definitely whether they are averages
not?
A. No; they were taken for those elevations on there, taken from
e rating curves for those elevations shown on there, the gauge
ights, and represent the peak where they come at the top.
Q. You had a rating curve for each of these gauging stations?
A. Yes.
Q. And applied that rating curve to some of these gauge
ights?
A. Yes.
Q. And from that read off a figure which you superimposed on
is chart?
A. Yes.
Q. Will you supply to us the rating curves for each of these
uges from which you computed the figures of rate of flow which
u have superimposed on Exhibit 114, and the same thing for
xhibit 113, if there are any figures of that character on it? It is
t quite clear to me whether some of those figures are rate of flow
not.
A. Yes. As a matter of fact, I think all of those rating curves
ll be introduced in court by another witness.
Q. If they are not, in any event you will supply it?
A. We can supply it.
Q. Will you look a moment at Plaintiff's Exhibit No. 115. Am
right in understanding that Plaintiff's Exhibit No. 115 is a hy-
ograph which shows the rate of discharge at a number of gaug-
g stations on New River, to wit, Caperton, Eggleston, Glen Lyn,
anawha Falls, Ivanhoe, Allisonia, and Galax?
A. Yes.

Q. And that chart has on the left-hand margin a scale showing rate of discharge in second-feet; is that right?

880 A. Yes.

Q. And a horizontal scale at the bottom showing the time factor as extending during certain days of July 1930?

A. Yes.

Q. So that the chart is intended to show the rate of flow simultaneously occurring at a given time so far as the chart extends at each of those stations?

A. Yes.

Q. To find the flow at a lower gauging station which might correspond with the rate of flow shown—for instance at Ivanhoe on July 18th—one would have to know the lag between that station and such other stations as might be used for purposes of comparison?

A. Yes.

Q. Can you tell me the date of the rating curve that you used for each of those stations?

A. No; I cannot.

Q. Will you produce for us a copy of the rating curve?

A. The same rating curve as for the chart just presented?

Q. If you used any published rating curves, it will be satisfactory to supply us with references to the published ratings curves which you used?

A. I don't recall whether any of them are published. They are all issued by the United States Geological Survey and we get them from them regularly.

Q. I should like to direct your attention to Exhibit 116 for a moment. Do you recall that your Exhibit 116 is a profile drawing of the Kanawha River showing backwater studies?

A. Yes.

Q. At the Marmet Dam you show backwater elevation for 2,000 second-feet, 566.10; 6,000 second-feet, 566.83; 10,000 second-feet, 567.97. If you will turn to your Exhibit 117–B, you will see that you show corresponding backwater elevations for

881 2,000 second-feet of 566.35; 6,000 second-feet, 567.15; and 10,000 second-feet, 568.20. Will you explain the reason for the discrepancy in those backwater figures?

A. They are entirely different problems, Mr. Jackson. These curves were based on average conditions. They might be above or might be below the crest of the dam below, but on this curve that you have there now, backwater curve, we have definite assumptions. The water was to be at the crest of the dam next below and with a given flow, given discharge of 2,000, 6,000, and 10,000 second-feet, so we had all the assumptions we needed to figure those backwater effects.

Q. Is it 116 that gives averages?

A. Gives what?

Q. Average conditions?

A. No; that gives a fixed assumption there of so many second-feet and with a certain elevation of the lower end of the pool.

Q. On Plaintiff's Exhibit 116 you show a low-water flow of 1,000 second-feet. Where did you get the data for that?

A. Low-water flow of 1,000 second-feet? I don't remember just where we got it. We got it from some publication, from some record in our office. This low-water profile was evidently based on that flow. The low-water profile is shown right here [indicating].

Q. I didn't know whether that was just an assumed flow?

A. No, I am pretty sure that is based on some record that we have showing that low-water profile of the Kanawha River.

Q. Will you furnish us the information as to the data upon which you based that low-water flow of 1,000 c. f. s. and the citation to some official publication and also the gauge heights?

A. All the information we can give you, yes.

Q. The gauge heights at the points you show here on this profile?

A. Yes.

Q. On this profile you show the jagged line representing the bottom of the channel?

A. Yes.

882 Q. Where is that taken from, from what part of the bed?

A. Supposed to be the sailing line of the navigation channel.

Q. Is it the thread of the stream?

A. Sometimes it is and sometimes next to one bank, the way the boats go, as I recall it, generally plotted on the sailing line.

Q. It isn't necessarily the deepest point?

A. No; the sailing line ordinarily goes near the deepest point.

Q. The deepest point in a stream is not always in the channel, is it?

A. No; certainly not, but generally the channel tries to get near the deepest point.

Q. Will you tell me what you mean by the sailing line?

A. The line of the center of the channel that the steamboats are supposed to follow.

Q. Mr. Winn, have you got Exhibit 119? This Exhibit 119 is entitled "Kanawha River and Tributaries, proposed improvement." What is meant by "proposed improvement?"

A. Well, they are projects that have been studied and reported on.

Q. By whom?

A. By the District Engineer at Huntington and by him through the Division Engineer in Cincinnati to the Chief of Engineers at Washington.

Q. Do you mean that all of the projects that are shown on here with the dotted line, according to your legend at the bottom, are projects which have been studied and approved by the Corps of Engineers?

A. Well, as stated here, those with the dotted lines are proposed projects in the 308 Report.

Q. Can you identify that report by official description?

A. Yes; I can give you a copy of it. It is printed, but I don't remember the number now.

Q. Will you supply that?

A. Yes.

Q. Am I right in understanding that you mean by all of these projects covered by the legend "proposed project, 308 Re-
883 port" that they were studied and favorably reported upon in some report of the Corps of Engineers made to the Secretary of War or to Congress?

A. They were reported on, but I wouldn't say favorably reported of all of them because there wasn't any definite recommendation that some of them be built.

Q. Have you projects on here as to which there has been a recommendation that they not be built?

A. I don't know whether there was any direct proposal that they not be built, but the indication was that it wasn't economically feasible to build some of them at the present time.

X Q. As I understand you this exhibit was entirely prepared under your direction, except for the coloring?

A. Yes, sir; and these two projects up here on Elk River.

X Q. The Centralia and Ralph projects?

A. Yes, sir.

X Q. As I understand you do not vouch for those but they were put on by Col. Watkins?

A. He got the information out of our office, but they were not published in any reports.

X Q. Are they private or public projects, do you know?

A. They are all governmental projects.

X Q. I direct your attention to the project designated as the Radford project, just above the Little River. Is that the same as the project of the defendant?

A. Yes, sir.

X Q. Mr. Winn, did you put on all of the outlines on this Exhibit #118 or chart?

A. All except those within these colored areas that Col. Watkins has put on.

XQ. You now refer to certain lines which deal with pool elevations and which are colored in part brown and in part blue?

A. Yes, sir.

884 XQ. And were those lines put on by you or Col. Watkins?

A. I think they were put on by Col. Watkins; at least he colored them in there.

XQ. I would like to get at that because I want to know whether you are vouching for the lines or whether Col. Watkins is?

A. I just can't answer that right now.

XQ. Take for instance the lines above.

A. I am pretty sure I didn't put those on just looking at them; but I can say almost positively I didn't put those on.

XQ. Anyway you don't vouch for those lines?

A. No.

XQ. Is that true of all the dotted lines inside of which the area has been colored either brown, red, or blue, as it appears on this map?

A. Yes, sir.

XQ. At least one color is blue or orange or red, or something of that kind?

A. Yes, sir.

XQ. I refer to those coloring on the lines dealing with levels at the upper end of the pools. Those lines as well as the coloring you do not vouch for, is that right?

A. No; I do not vouch for those.

XQ. You did outline the bottom of the stream as it appears on the profile?

A. Yes, sir.

XQ. And the brown coloring which has been placed on part of that outline of the bottom of the stream was placed there by Col. Watkins, and not by you; is that right?

A. Yes, sir.

XQ. Now will you look for a moment at the right-hand part of your chart and particularly the pool above the London dam, and what was formerly the pool above the old dam #2,

885 you show there a line with an elevation of 611, do you find that?

A. Yes, sir.

XQ. The depth from that line to the bottom of the pool is how much?

A. At what point?

XQ. Well, at the upper end of the pool?

A. Why, practically nothing right at the mile—I don't see the mileage now.

X Q. Take it at mile 90.5.

A. Well, at 90.5 it seems to be about three feet deep there.

X Q. Three feet?

A. Yes, sir; according to mine here—maybe I am wrong.

X Q. Isn't it 9.10 feet plus?

A. No; right at 90.5 it shows about three feet.

X Q. Did you say 90.45?

A. No; 90.5; follow that up right at the middle there. I thought you meant from the old low water—do you mean to go to elevation 611?

X Q. Yes.

A. Yes; that would be very different, that would be, looks like, about 17.5 feet. You can't tell exactly.

X Q. What is the elevation at 90.5?

A. I take it to be 597.5. What do you make it?

X Q. That seems to be about right.

A. That would make 13.5—597.5 from 611, makes 13.5.

X Q. That 90.5, as I understand from your Exhibit #116, is the head of navigation, isn't it?

A. Yes, sir.

X Q. I want to hand you a document officially entitled, "House Document 91, 74th Congress, 1st Session," and ask you whether that is the 308 report to which you refer to on exhibits 119 and 120?

A. Yes; this is the 308 report.

X Q. Am I right in understanding Exhibit 120 is merely a profile of the rivers designated showing thereon a profile of
886 the various projects which you have otherwise shown on Exhibit 119?

A. Yes, sir.

X Q. Now, for instance, if you will refer a moment to the project designated "Bluestone project" on Exhibit #120, did you put the lines showing low water, usable storage, reservoir project, on that exhibit, or were those lines put on by Col. Watkins?

A. I don't recall whether I put them on or not.

X Q. Are you able to vouch for the accuracy of the lines delimiting the reservoir project and usable storage and low water?

A. As proposed in that 308 report, I can vouch for the fact it was supposed to have a maximum pool at elevation 1,520; that shows there that the power pool was to be at 1,490, that is shown, and that will show you the amount between the power pool and the maximum pool, the storage was to be devoted to flood control. Low elevation 1,490 was for power purposes, so to that extent I can corroborate this here.

X Q. Are you able to vouch for the other lines which undertake to delimit the draw-down?

A. The draw-down—no; I could not vouch for that right now.

X Q. As far as you know, that is not in the report?

A. I don't recall whether it is or not. It is in the supplemental report if anything.

X Q. At any event you don't vouch for the line which delimits the draw-down?

A. No; if anything, it would go lower than is shown here; it might go lower.

X Q. As a matter of information you have here a number of mileage figures, such as, for instance, 54 miles Sandstone Falls?

A. Yes, sir.

X Q. Can you tell me the source of those figures; what you took them from?

A. I believe we stepped them off from the U. S. Geological Survey maps.

887 X Q. Your best recollection is you took the U. S. Geological Survey maps, and undertook to measure along the river?

A. Backed up by any Government surveys we might have had.

X Q. Do you recall any you had?

A. No; I don't recall now which ones we checked up.

X Q. I think you told me at the end of the noon recess that you wanted to make some corrections in your testimony with reference to exhibits 117–a to 117–f, inclusive, and I will be very glad to have you make any correction you would like to make.

A. There was some confusion in going from one of these rating curves to another, and I want to make one statement that will cover all of it. These lines showing where they divide, for any particular project, this top part of that line represents the flows or gauge heights with the dams in place. That is the only thing we have basic information for. The bottom part of that curve is more or less sketchy, sketchy representation of what the gauge height would have been for different flows with open river, without any dams built or dams down.

X Q. A more or less sketchy estimate?

A. Yes, sir; and the only reason for putting it in this is to bring in the fact this curve shows the backwater effect from the next dam downstream, instead of popping up like an ordinary rating curve would on the river it takes this shape.

X Q. You want your testimony to show in relation to Exhibits 117–a to 117–f, inclusive, in each case wherever a curve separates into two parts at the left-hand side of the page, the upper side of the curve, is the one with dams in place?

A. Yes, sir.

X Q. And the lower branch which drops rapidly is a sketchy outline of an estimate of what the gauges might have been if there had been no dams in the river?

A. That is right.

By Mr. McCLERNAN. May I ask a question there? Are
888 you using the word "sketchy" advisedly?

A. I mean we didn't have the basic data we had for the other. The other is the important one, and is the one that shows the effect of the next dam below the rating curve below each dam and that rating curve shows the effect of the back-water from the next dam downstream. I don't think that other end means anything at all if we hadn't put it on there.

X Q. You don't mean to change your testimony that even the upper branch of the curve on these exhibits, the curve is a matter of estimate, and not of a record of observations of gauge heights, with concurrent or simultaneous gauge or discharge measurements?

A. No, sir; everything in my testimony will stand except in some places with regard to the high point of the curve, and I wanted to be clear the same thing obtained for every one of the locks.

X Q. Mr. Winn,-I want for illustration to direct your attention to Exhibit #117-d, the upper branch of each curve, such as for instance the curve labeled "Marmet with Winfield Dam in place" and ask you if the left end of that curve does not show the level of the pool dropping below normal?

A. Yes, sir.

X Q. And that is true for the other curve for Marmet with Pool #6?

A. Yes, sir.

X Q. Is there any basis for the ending of those curves?

A. Not unless the water was shut off above and it drained out that much, is the only thing I can see.

X Q. You will notice there has been erasures on those curves. Do you know why that was?

A. No, sir.

X Q. Did you make them?

A. They were made in my office down there. I didn't make them personally.

X Q. Wouldn't it be improbable, if not impossible, that
889 those levels could drop below the normal pool levels, unless there was leakage at the dam below?

A. Yes, sir; unless the water was cut off from above.

X Q. At these low flows that wouldn't happen, would it?

A. Not likely. I will have to change that, too. It might cut them off with a power plant.

X Q. I asked you for some information this morning and perhaps it will help you if I show you this. Could you supply us with that information for the dams on the Ohio comparable with

this information for dams on the Kanawha, which I exhibit to you, in order you may know precisely the nature of the request? Will you do that?

A. Yes; we will be glad to.

By WITNESS. May I say this. There is a book published called the Ohio River Book, and it has got all of this information in it. You can get a copy of it for a dollar. You can get the distances, the lay-out, locks, heights of pools, and everything else, if you want to get that.

Re-Direct Examination by Mr. MCCLERNAN:

Q. Mr. Winn, the cross-examination has been directed to the possibilities of errors or defects in these figures that you prepared or had prepared. Were the computations made on regularly accepted theories?

A. Yes; I would say so.

Q. Were the methods you used the methods that engineers use in general?

A. The methods they would use; yes, sir.

Q. Did you distort any facts you found?

A. Not at all; no, sir.

Q. Are the figures which you have produced here the best figures of that nature that are available?

A. They were the best we could do, and the best available.

Q. I have here Exhibits 110 and 111. These, as I under-
890 stand, are originals that you have been asked about, and I want to know if you removed them from their regular place in the Huntington office and brought them here?

A. Yes, sir; that is all.

Q. What use is made of these records in the Huntington Office?

A. They were originally intended to preserve a record of the navigable status of each one of these locks for the years that they were in operation, but since then they have been used for hydro studies in a number of cases.

Q. Can you tell us briefly how these records are made out at each lock, whether by the Master or one of his assistants, who goes out and reads the gauge?

A. At present, they are reading them every hour in the day, but that has not gone back very far.

Q. Those readings, are they open to the public?

A. Yes, sir.

Q. In what way?

A. We supply copies of those records to anybody who asks for them.

Q. Before these records were made up, were the lock readings available to navigators?

A. Yes, sir; they are posted at the power house and they could read them from the stream.

Q. Do you have any complaint that the figures are unreliable?

A. Never, to my knowledge.

Q. Do you know whether or not navigators on the stream actually read those figures, and use them?

A. I just have to presume they do. They are put there for their benefit. I have not traveled over that part of the river on a steam pilot boat, and I don't know that they actually do that or not.

Q. But they are posted in such position that they are visible from the stream?

A. Yes, sir.

891 Q. My recollection is that opposing counsel asked you on Friday concerning some construction work which was presumed to have been done on the Ohio some years ago. Do I understand that the remarks you made about the construction work are inferences that you drew from Exhibits 111 and 112?

A. That is all I had to draw from during the time you are speaking of.

Q. You infer from examining some of those figures that there was construction work going on?

A. Yes, sir.

Q. Could the characteristics of those figures which led you to that conclusion have eben caused by anything else?

A. Yes; they could have been by operation of a dam upstream or downstream, and back in the early days before all the dams were completed it was the practice to collect traffic in a pool upstream and then bring the water down the river in a wave, over sections of the river where dams had been put in, and it might have been caused by something like that.

Q. As a matter of detail, Mr. Winn, there was some discussion about these wicket-dams, or movable dams. Isn't it true that the wickets which made up the dams, or at least a large part of them, are about three feet nine inches wide, with a space approximately three inches between each pair?

A. Something like that. There is supposed to be a wicket for every four feet of the dam.

Q. I think you testified that these exhibits which were introduced on your direct examination, except these gauging records, Exhibits 111 and 112 were prepared especially for use in this case?

A. Yes, sir.

Q. But even so, they do not deliberately distort the facts they purport to represent?

A. No, sir; a great part of them are based on previous drawings and charts, and we just put in new information for this case.

Q. They are as correct as they can be under the circum-
892 stances, are they not?

By Mr. JACKSON. I object to that question.

A. Yes, sir.

By Mr. MCCLERNAN:

Q. Calling your attention now to Exhibits 110–111, were these exhibits or records prepared for the purposes of this case?

A. No, sir.

Q. Do you recall that Exhibit 112 is a tabulation made by yourself from some other records?

A. Yes, sir.

Q. These records from which that tabulation was made were not prepared for the purpose of this case?

By Mr. MCCLERNAN:

Q. There was also some discussion here that in preparing some of your exhibits you did not take in consideration the leakage from the dam. Why was that?

A. It was not necessary because we were basing it on gauge heights below the dam we were considering.

Q. It is a fact when a dam leaks that the leakage may vary and prevent accurate computation of stream flows?

A. The stream flows were not based on that. They were brought down from Kanawha Falls and Lock 2, and they were simply referring to gauge readings below the dam for which rating curves were being made.

Q. You have not answered my question. As a general proposition, it is a fact there may be dams in the stream, and the dams leak, which would prevent the computation of the flow of that stream?

A. No, sir; because the flows did not have anything to do with that. They were based on measurements upstream from them and whatever happened down below would not have anything to do with it. That much flow was going by there, we figured.

Q. Was it possible to determine the flow of a stream regardless of the fact that the water in it may be very low?

A. You cannot determine it very accurately when the flow gets so low or the velocity gets so low that you cannot get any click out of your current meter, and you cannot measure it with
893 any accuracy. You could then measure the float, but it would be pretty hard to do it.

Q. As I understand it, the Kanawha River, where it joins the Ohio, flows into a pool which is formed by Dam 26. Is that correct?

A. Yes, sir.

Q. And this pool behind that dam extends up above the mouth of the Kanawha?

A. Yes, sir.

Q. Referring again briefly to these Exhibits 110–111, there have been some discussion of some figures in pencil. Were they on the exhibits when you got them out of the files?

A. They were.

Q. Now, Mr. Winn, does the fact that some pages of these Exhibits 110–111 do not have the impression of a rubber stamp showing the date when they were received, have any effect upon the accuracy of the figures?

A. Nothing at all; no, sir.

Q. That is merely a device that is used in order to keep a record of when the sheets came into the office. That is all it is made for?

A. Yes, sir.

Q. Have you any reason to believe, Mr. Winn, that there is any substantial error in those records, Exhibits 110–111?

A. No, sir; I have no reason to believe it.

Q. I recall also some discussion about the fact that in preparing your rating curves for points below Kanawha Falls you used the volumes of stream flow at Kanawha Falls. Would there be any substantial difference between the flow at Kanawha Falls and points down below in the river?

A. At extreme low stages there would not be, to speak of, because the smaller streams dry up and do not put out anything.

Q. That is, you mean the tributaries to the river?

A. Yes, sir.

Q. I think you were also asked a question concerning the
894 computations of volume of stream flow from gauge heights and I believe you were asked whether it was done contemporaneously, or something to that effect. When you have a gauge height record in your department of the stream flow, is it necessary to make a computation immediately?

A. I do not understand that question, or what you mean by it.

A. I understood Mr. Jackson to ask me if there was any discharge measurement made right at this point for this particular purpose; there wasn't any.

By Mr. McCLERNAN:

Q. Will you answer my question, if you can?

A. I will have to have the question read.

A. No, sir; it is not necessary.

By Mr. McCLERNAN:

Q. Mr. Winn, in your testimony, having to do with the Winfield Dam and the Gallipolis Dam, have you assumed in part when those dams will be completed upon schedule?

A. I have no reason to believe they will not be completed on schedule.

Q. Although there is no certainty that they will be?

A. No, sir.

Recross-Examination by Mr. JACKSON:

Q. One question, Mr. Winn. When you computed your flow from stream measurements upstream at Kanawha Falls, there was involved in that computation gauge readings made down below the other dam, was there not; that is, you developed the rating curves to apply to gauge readings also downstream?

A. Yes; but not with reference to gauge readings on the Kanawha River, but with reference to gauge readings of tributaries that came in below.

Q. When you took gauges at Locks 2, 3, and 4 on the Kanawha River, as you did in your Exhibit 112; you took readings at those locks, didn't you?

A. No, sir; we took readings or probably took discharge as shown by our rating curves at old Lock No. 2, and then transferred them down to 3 and 4 by proportional drainage areas.

895 Q. Your Exhibit 112 shows your flows at Kanawha Falls.

A. Yes, sir.

Q. And it shows gauge heights at the dams downstream, doesn't it?

A. Yes; but that was for a different purpose, to show how much leakage there was through those dams for certain flows at Kanawha Falls.

Q. If you have a flow of a thousand second-feet above the dam, the stage in the pool at the dam will depend upon how much leakage there is, will it not?

A. Yes, sir.

Q. And it will vary with the leakage?

A. Yes, sir.

Q. That is, you might have a flow of thousand second-feet at Kanawha Falls?

A. Yes, sir.

Q. And at Lock 2 Dam that might produce a different gauge reading, dependent upon variations in leakage at Dam 2?

A. I would produce different gauge readings above the dam, but we are making rating curves below the dam. And the only way leakage would affect that would be the leakage that would draw a little bit above that pool every day and bring it a little lower.

Q. If you undertook to apply your thousand-foot flow to gauge reading below No. 2 Dam, then you immediately become affected by variations in leakage in No. 3 Dam, don't you?

A. Yes, sir.

Q. So that all that would happen if you took the flow upstream from dams, with a gauge height at dams downstream, if they are leaking, it will vary for that given flow in accordance with the variations in the leak?

A. Certainly.

896 COLONEL HARRY M. TRIPPE

Direct Examination by Mr. THOMPSON:

Q. Please give your name to the reporter.

A. Harry M. Trippe.

Q. Where do you reside?

A. Wilwaukee, Wisconsin.

Q. What is your occupation?

A. District Engineer.

Q. Of what?

A. The Milwaukee District.

Q. For the United States?

A. Yes, sir; Corps of Engineers.

Q. How long have you been located at Milwaukee?

A. Practically six years.

Q. Were you ever located at Huntington, West Virginia?

A. Yes, sir.

Q. In what capacity?

A. District Engineer.

Q. During what years?

A. From June 20, 1923, to May 27, 1927.

Q. Colonel, will you please give a statement of your schooling and experience as an engineer?

A. I graduated from the University of Wisconsin with degree of B. S. C. E. in 1896. Spent three seasons as assistant topographer for the United States Geological Survey, 1896 to 1898. From 1898 to 1912 I was on railroad location, construction, and maintenance. From 1912 to 1913 I was contracting. From 1913 to 1916 I was acting as consulting engineer. From 1916 to 1917 I was civil engineer for the United States Commerce Commission. From 1917 to 1919 I was in the Army with rank from Captain of Engineers to Colonel of Engineers. From 1919 to 1920 I was on the staff of the Wisconsin Railroad Commission for the State of Wisconsin. From 1920 to the present time I have been in the United States Army with rank of Major and Lt.-Colonel of Engineers.

897 Q. Have you ever had any experience in river and harbor work?

A. Yes, sir; four years in the Huntington District and six years in the Milwaukee District.

Q. Were you ever located in Panama?

A. Yes, sir; three years.

Q. What kind of work were you doing there?

A. Military duties, mapping and military work.

Q. What were your duties as District Engineer at Huntington?

A. I had charge, representing the Chief of Engineers of the Huntington District, looking after the public property, river and harbor work, care and preservation and operation of the public works in that district. The district comprised the Ohio River, from Dam No. 12 at Wheeling, West Virginia, to a point a little below Stout Run, Ohio, a distance of practically three hundred miles. The district takes in all of the waters draining into that section of Ohio River.

Q. That includes, does it, New River and Kanawha River?

A. Yes, sir.

Q. When you took charge at Huntington, I believe you said in 1923, state what engineering data there was available there with respect to the New and Kanawha Rivers?

A. There was a great deal of data, including annual reports of Chief of Engineers from 1871 to the time I was there, the Geological Survey Water Supply Papers were on file there, with a great deal of other data that I cannot recall now, that is, I cannot recall all of it. There was a report made by Moore and Briggs, I believe in 1819, and a great deal of other data that I cannot recall just now.

Q. Do you remember the condition of the Kanawha and Ohio Rivers during the year 1925, in the summer time?

A. I remember them very distinctly in the month of September.

Q. What was the condition of the Kanawha River?

A. Very dry, very low.

Q. What was the condition of the Ohio River?

A. Very low.

898 Q. What was the state of navigation on those two rivers at that time?

A. Navigation was interferred with quite considerably, due to the low stages. We had a great deal of trouble in maintaining the pool, and on the Kanawha River it was not possible at all times to keep the pools up to the required depth, especially at Dams 2 and 4 on the Kanawha River. I remember those particularly.

Q. If there had been any diminution of the water in the Kanawha River flowing from the New River at that time, what effect would it have had on navigation in the Kanawha River?

A. It would have had a very serious and bad effect on navigation.

Q. State whether or not you ever had any complaints during 1925 as to the condition of navigation on the Kanawha River?

A. Yes, sir; I had.

Q. Describe those to the Court, if you please.

A. I cannot recall the exact reports, but I know we were getting reports from both rivers. I made several inspection trips on both Rivers to see that everything possible was being done to maintain navigation.

Q. Was there much difficulty in maintaining navigation?

A. Very much so.

Q. Do you recall a plant called the Electro-Metallurgical Plant?

A. Yes, sir.

Q. Where is that located?

A. At Kanawha Falls.

Q. Did you ever have any business with them with respect to navigation during the year 1925?

A. Yes, sir.

Q. State what that was.

A. In September 1925, due to complaints received as to navigation in the Kanawha River I had my assistant go to the manager of the plant at Kanawha Falls and direct them to cease fluctuating the water, that is, letting out the water and then storing it for a short time, as it was having such a bad effect on our maintaining the pool for navigation.

899 Q. What is there at Kanawha Falls that was fluctuating the water?

A. A power plant.

Q. There is a dam there, isn't there?

A. Yes, sir.

Q. And who owns that dam?

A. The Electro Metallurgical Company of America.

Q. Roughly speaking, is it a large storage dam, or a small one?

A. A very small storage, and yet it was fluctuating the water coming through there.

Q. And that power plant or project was affecting navigation below?

A. Yes, sir.

By the COURT:

Q. How far was the Kanawha River navigable at that time, I mean how far up the river?

A. My recollection is there were five or six miles below Kanawha Falls, from the mouth of Kanawha Falls, up to about five or six miles of the Falls.

Q. All of those old dams they had in there at that time, had locks in them, did they not?

A. Yes, sir.

By Mr. THOMPSON:

Q. You mean what kind of navigation by what you said, navigable to within five miles?

A. Six-foot navigation.

Q. Was it possible to navigate boats drawing less than six feet further up the stream?

A. Yes, sir.

Q. State whether or not there is a pool back of the dam at Kanawha Falls?

A. Yes, sir; there is.

Q. I hand you, marked for identification, Government Exhibit 123, dated August 29, 1919, and signed by W. J. Knapp, Vice President, Electro Metallurgical Company, and will ask you if you know what that is.

900 A. It is a letter from Mr. Knapp to the Secretary of War, requesting a permit to make such repairs and replacements as are shown on the enclosed blue prints and tracings.

Q. Will you look through this document, and say whether the permit was granted or not.

A. I don't know, but I understand there was no objection to it.

By Mr. THOMPSON:

Q. Will you please look at the letter dated March 2, 1899, and read it.

A. "Office of the Chief of Engineers, United States Army, Washington, 1899, March 2, addressed to Major W. H. Bixby, Corps of Engineers, Cincinnati, Ohio. Major: There is sent you herewith a copy of an instrument, dated the 27th ultimo, granting the permission of the Secretary of War to the Willson Aluminum Company to construct a dam on the crest of the Falls of the Great Kanawha River, West Virginia, as shown on the attached blue print. Your attention is invited to the conditions upon which the permission is given."

By Mr. JACKSON. We object to the letter which has just been read, because it was not in response to the request for the letter which counsel first addressed to the attention of the witness, which was dated October 29, 1919, and this letter was dated in 1899.

By the WITNESS. Twenty years apart.

By Mr. THOMPSON. We have them in the reverse order, 1899 and 1919.

By Mr. JACKSON. You confined the letter which you first asked him about on the fourth sheet, the one dated October 1, 1919.

By Mr. THOMPSON. My point in introducing this is to show the permit which is appended in the back part of this document.

901 Q. I now call your attention to the last two pages of the document, not including the map, and ask you what that is.

A. This is a permit issued to the Willson Aluminum Company by the Secretary of War on the 27th day of February 1899, giving them permission to construct a dam on the crest of the Falls of the Great Kanawha River.

By Mr. JACKSON. Is there anything to show that was sent to the Company?

By Mr. THOMPSON. We will introduce evidence to show that.

By Mr. JACKSON. We were supplied with a copy of this exhibit in advance, but the exhibit you now offer seems to contain less material than the one we were supplied with.

By Mr. THOMPSON. You can introduce any material that is not in here. You have a copy of the document now being introduced.

By Mr. JACKSON. The only point I make is, I have a further objection to the exhibit insofar as a part of the material has been removed from the exhibit now offered, and which was in the exhibit as supplied to us by the Government as the exhibit to be introduced, a change having been made to facilitate examination. I object to it until there is included in it the additional material.

By the COURT. The additional material may not be material.

By Mr. JACKSON. It is a letter requesting a permit, and recites in it that while it seems perfectly manifest that the river is not navigable, out of abundance of caution they ask for a different permit.

By the COURT. If what they offer is material, I think they should introduce it. You say the exhibit they gave you had more material in it than is now in this exhibit. It may be what they omitted is not regarded as material by them. I cannot control that. You may develop it in cross-examination.

(Exhibit 123 offered in evidence.)

By Mr. THOMPSON:

Q. I call your attention to a map that goes with this license, and will ask you if there is anything on there indicating a sluiceway for logs.

A. I do not see any; no, sir.

Q. What is this here [indicating]?

A. Section of proposed dam.

By Mr. THOMPSON:

Q. Now, state by what authority you approached the Company that had charge there at that time, the Electro Metallurgical Company.

By Mr. JACKSON. You mean by what legal authority.

By Mr. THOMPSON. By what legal authority then. They had to approach them to stop sending this water through that dam under certain conditions, and I asked him upon what authority he, as a Federal officer, approached them.

By the COURT. He can answer that question.

By Mr. JACKSON. We desire to take an exception.

A. On the fact they had a revocable permit by the Secretary of War for that structure.

By the COURT. What was your objection, Mr. Jackson?

By Mr. JACKSON. If it is material with what legal authority an officer of the United States approached the Electric Metallurgical Company or any other company, or to give them orders or directions, then I think it will be for this Court to determine what that legal authority was, and not for the witness to state it. Obviously the question and answer is to argue to your Honor that they had a revocable permit, and there would have been no occasion for a Federal officer to remonstrate because under the Act of 1899 there would have been full authority whether there was a permit or not.

By the COURT. As I indicated a minute ago, the Secretary of War may have granted a permit, the fact that this Company thought the Secretary of War had control of it, or thinking the Secretary of War asserted control over it, they thought they would rather have his consent, rather than have any argument about it.

By Mr. JACKSON. I was discussing the proposition that it is not dependent upon whether this is a revocable permit, that being a legal point which we will eventually argue to your Honor, and I do not think this witness ought to express an opinion on it without objecting.

By the COURT. Very well.

By Mr. THOMPSON:

Q. In answer to what counsel has said, I will ask you to read what is designated as paragraph 3 on the bottom of this license, or this permit.

A. "That the work herein permitted to be done shall be subject to the supervision, and approval of the Engineer Officer of the United States Army in charge of the locality." There is one word in there I cannot make out, but it looks like "Army."

Q. Have you ever been up the New River?

A. Yes, sir.

Q. On what occasions have you been up New River?

A. As well as I can remember, I have taken at least two trips up to the mouth of Wilson and one trip quite a ways beyond.

I held a hearing at Bluefield at the time I visited New River. I held one at Roanoke at the time I visited New River. I held one at Radford for the Central Power Company.

Q. You say you held meetings up there? What do you mean by that? Do you mean that you held hearings for a license to the Central Power Company?

A. I held a hearing at Roanoke, Virginia, on the application of the Central Power Company. They wanted the right
902 to divert water over the Yadkin River. That was held, if my memory serves me correctly, in January 1925. I held one in January 1925 on the application of the Eastern State Development Company to divert water from New River into the Atlantic Ocean, I forget the name of the stream. I held a public hearing at Radford on October 28, 1925, on the application of the Appalachian Electric Power Company to construct a dam about six miles above Radford, Virginia. On these three occasions I visited New River, and I have visited it at other times.

Q. That hearing you spoke of that you held on the application of the Appalachian Electric Power Company, that was held as I understood you to say, at Radford, was it not?

A. Yes, sir.

Q. Do you remember the date of that hearing?

A. October 28, 1926. I gave that wrong before when I said 1925.

Q. Was a stenographic report of that hearing made?

A. Yes, sir.

Q. I hand you Government Exhibit 101, and will ask you if any representatives of the Appalachian Electric Power Company were present at that hearing, according to this record. First of all, did you send out notices of this meeting?

A. Yes, sir.

Q. What kind of notices did you send out?

A. I sent out a notice that there would be a public hearing held on the application.

Q. Did you advertise these notices in the Press?

A. Yes, sir.

Q. The Press of what States?

A. I will have to refresh my memory on that.

Q. All right, do so.

(Witness examines Exhibit 101.)

A. Do you wish me to read a list of all the newspapers?

Q. No; just give the States, I believe it says Virginia, West Virginia, and New York.

A. It says West Virginia, Maryland, Virginia, Chicago,
903 Ill., and New York States.

Q. Did you also send word to the Postmasters of the Country?

A. Yes, sir; I sent notices to the Postmasters in Virginia and West Virginia.

Q. Now, look at the index of the contents and tell us who were the parties present representing the Appalachian Electric Power Company.

A. There is a long list here of the interested parties present. R. E. Scott, R. J. Noell, A. H. Chumbley.

Q. Now, turn over to a summary of the proceedings at the hearing.

(Witness does so.)

A. There seems to be one page left out of this exhibit, Summary of Proceedings gives the place and names of representatives of the Appalachian Electric Power Company that were present: L. J. Bevan, H. W. Buck, John S. Draper, R. J. Holdren, H. E. Sledd, C. M. Micou, counsel for the A. E. P. Co., R. E. Scott, counsel for the A. E. P. Co., Col. F. W. Scheidenhelm, Engineer for the A. E. P. Co., and R. S. Slocum, for the A. E. P. Co.

Q. Suppose you read the opening paragraph of your statement to the meeting, found on page 2 here.

A. (Witness reads.) This meeting has been called for the purpose of hearing evidence on the application made by the Appalachian Electric Power Company, Richmond, Virginia, to the Federal Power Commission. The company has asked for a license for a project of water power development on New River at a point approximately one mile above the mouth of Little River and seven miles above the City of Radford, Virginia. They have asked for a license allowing them one year from the date of such license to begin construction and four years for completing construction of the project works. The license, if granted, will authorize the construction, operation and maintenance for certain project works, the principal ones of which are designated as follows——

Q. Don't read that description there. Read next the last paragraph on page 3.

A. (Reading.) It is desired to have a frank and full expression of the views of all interested parties and as complete a
904 statement as possible of all information bearing upon the question at issue.

Q. Read the next paragraph.

A. (Reading.) "The Department will give full weight to all evidence and arguments presented at the hearing; and all pertinent material which the parties wish considered should be brought out at this hearing.

"Later ex parte evidence and arguments are not desired by the reviewing authorities unless it is clearly shown that the matter is new and material and that there are good reasons why it could not have been presented at this hearing."

Q. Just by description of the paragraphs, will you state what part of the law of the Federal Water Power Act you read from—Section 4 (d)?

A. The law applicable is Federal Water Power Act, approved June 10, 1920. (Sec. 4 (d).)

Q. You called attention and read that section 4 (d), did you?
A. Yes, sir.
Q. And Section 6?
A. Yes, sir.
Q. And part of Section 10 (c)?
A. Yes, sir.
Q. Wait a minute. And Section 10 (f)?
A. Yes, sir.
Q. And Section 27?
A. Yes, sir.

Q. State whether or not you had protests at that meeting against offering or granting a license of this kind?

A. Yes, sir; there were four protests received at the hearing, and I believe two letters received later.

By Mr. JACKSON. I should like to have our objection to this line of testimony entered in the record, on the ground that it is immaterial, irrelevant, and incompetent, with reference to any hearing that they had or any objections. There is no link with any proceedings as to the findings.

By the COURT. The objection is overruled.

By Mr. JACKSON. May we have our exception for reasons heretofore stated?

By the COURT. Yes, sir.

By Mr. THOMPSON. The record of this hearing is already in evidence. We introduced it by Colonel Edgerton.

By the COURT. You were holding this in connection with the Chief of Engineers, were you?

A. The Chief of Engineers ordered me to make a report on the Application for a License with the Federal Power Commission; yes, sir. I was doing it under him.

905 Q. And you did make a report to him?
A. Yes, sir.

By Mr. THOMPSON:

Q. When you say that the report was sent to the Federal Power Commission and has been introduced—I desire to call the Court's attention——

By the COURT (interrupting). This witness testified as to what he did—his part of the investigation made by the Water Power Commission?

A. Yes, sir.
Q. He conformed with it?
A. Yes, sir.
Q. Through the office of the Chief of Engineers?
A. Yes, sir.

By Mr. THOMPSON:

Q. Refer to page 11 there, to the objection made by the Virginian Railway Company, and read the last paragraph—the next to the last paragraph.

A. (Reading.) "Accordingly The Virginian Railway Company prays that if a license be issued for the proposed dam it may be upon condition that said dam shall at all times be so operated as to pass through sufficient water, with the water entering New River below the dam, to afford all persons and property owners below the said dam, including said Railway Company, sufficient water for their needs."

Q. The last line of the letter says what?

A. (Reading.) "A copy of this letter is being sent to the Federal Power Commission."

Q. Turn to the objection made by the Electro Metallurgical Company and read the top paragraph on page 14.

A. (Reading.) "Electro Metallurgical Company does hereby protest however against the granting by Federal Power Commission to the said Appalachian Electric Power Company of the license applied for in the aforementioned Application or any amendment thereof or any substitute therefor unless such
906 License shall contain as a condition thereof a provision to the effect that no interference shall be permitted to be made in the flow past such dam as shall be authorized by or constructed in pursuance of such License, that may at any time restrict the natural flow of the said river or the continuous use thereof for power purposes at points down stream from such dam, in such manner that there would be through the operation of such dam or project, any diminution of the flow of the said river:

"(1) either below the natural flow of the said river whenever its natural discharge is less than its mean natural discharge, or

"(2) below the mean natural discharge of the said river whenever its natural discharge exceeds its mean natural discharge."

By Mr. THOMPSON:

Q. Now, did you have any other protests?

A. There were four, yes sir.

Q. Where were they sent to?

A. They were received at this hearing and two later ones were sent to the office at Huntington, West Virginia.

Q. Turn to page 15 and read the statement there by Mr. Scott. Who was Mr. Scott, by the way, according to the record?

A. (Reading.) "Robert E. Scott, counsel of Appalachian Electric Power Company, Richmond, Virginia," is the way I have it in the record.

Q. Read then on page 15, it would be the second paragraph.

A. (Reading.) "Mr. Scott: * * * I do not know that there is anything that I can add to what has already been done or to the proof that is already in. The nature and character of the proposed project is well known, and the character and nature of the stream is well known, and the navigation is a matter which is yet to be determined, and I do not understand whether that is expected to be gone into here or not."

By Mr. THOMPSON:

Q. Did you have any answer to that?

A. Yes, sir. I said: [Reading] "Have you anyone else that you care to present anything?"

Q. What did Mr. Scott say?

A. (Reading.) "There is nothing further now. I may
907 have to introduce someone later."

Q. At the top of the next page. Read what it says there?

A. I said: [Reading.] "I am now ready to hear anyone in opposition to the project."

Q. Now, the third paragraph, where it starts "Major Trippe."

A. [Reading.] "Are there any further protests?"

Q. No; where it says, "Judge Scott."

A. [Reading.] "Judge Scott, have you anything further you wish to say?"

Q. And you say below there: "Are there any further protests?"

A. Yes, sir.

Q. And then on page 17, the last two lines.

A. I said: [Reading.] "Anyone else desired to be heard? If not, the meeting will be adjourned and is adjourned."

Q. I hand you a letter consisting of two pages, being a photostatic copy, dated November 30th, 1926, addressed to Major H. M. Trippe, U. S. A., District Engineer, Huntington, West Virginia, and signed by F. W. Leahy, Secretary—I don't know just what that name is——

A. This is copy of a letter received from the Great Kanawha River Improvement Association, addressed to me at Huntington, West Virginia, and dated November 30th, 1926.

Q. Is that one of the protests sent in regard to this meeting or at this meeting?

A. Yes, sir.

By the COURT. What is the purpose of that; just to show there were protests?

By Mr. THOMPSON. Yes, sir; protests going to the question of allowing the natural flow of the river to continue on down, and this is the purpose—Major Trippe follows this up by making a report which is the report sent with General DeKyne's report,

and went to the Commission, and was with the Commission June 1st, 1927, when he made this report. I offer this document Pl. Ex. 124 in evidence.

By Mr. JACKSON. We object to its introduction in evidence, because it is immaterial, irrelevant and incompetent.

By the COURT. Is that from the Chamber of Commerce?

By Mr. THOMPSON. It is from the Great Kanawha River Improvement Association.

By Mr. JACKSON. That was admitted in evidence?

By Mr. THOMPSON. Yes, sir. Government Exhibit 1.4.

By Mr. JACKSON. We except to the ruling of the Court for reasons stated. Our exception is granted, is it?

By the COURT. Yes, sir.

By Mr. THOMPSON. This is in evidence.

Said exhibit is marked as Government's Exhibit 124 (Nc. 124) and is made a part of this record.

Q. I hand you, marked for identification Government's Exhibit No. 125, being entitled: "In the Matter of The Application of the Appalachian Electric Power Company, a Virginia Corporation, to Federal Power Commission—For a License, Project No. 739, with respect to water-power development on the New River at a point approximately one mile above the mouth of Little River and seven miles above the city of Radford, Virginia, upon which application a public hearing has been advertised to be held in the County Court room, at the City of Radford, Virginia, on Thursday, October 28, 1926, at 1:00 P. M." It is signed by the
908 Public Service Commission of West Virginia, by its attorney, I cannot read the name, and is dated November 3, 1926, and I ask if you know what that is?

A. It is a protest to the Federal Power Commission, dated November 3, 1926, by the Public Service Commission of West Virginia, by F. M.—some attorney; I don't know what that name is.

Q. Can't you make out the name. The signature?

A. It looks like Leahy. It was received in the Huntington, West Virginia, office November 13, 1926.

Q. Does it bear the mark of the Federal Power Commission?

A. Yes, sir; it bears the mark of the Federal Power Commission, "received April 14, 1927."

Q. Is that one of the protests that came in as the result of this meeting?

A. Yes, sir. It was under the Application.

Q. Please read, starting on page 52, the last paragraph.

By Mr. JACKSON. May it be offered so that we may object and have our exception?

By Mr. THOMPSON. Yes, sir; we offer it in evidence.

(Said paper is filed as Government's exhibit 125, and made a part of this record.)

By Mr. JACKSON. We object for reasons stated. May we have our exception.

By the COURT. Yes, sir.

By Mr. THOMPSON:

Q. All right, you may read the paragraph to which I referred.

A. (Reading.) The Public Service Commission of West Virginia, on behalf of the State of West Virginia, the citizens of said state, and especially those industries and individuals enjoying riparian rights and privileges on the New River and the Kanawha River, within the said state, hereby protests against the granting by the Federal Power Commission to the said Appalachian Electric Power Company of the license applied for in its said application, or any amendment thereof, or substitute thereof, unless such license shall contain as a condition thereof, a provision to the effect that no interference shall be permitted to be made in the flow past such dam as shall be authorized or constructed in pursuance of such license, that may at any time restrict the natural flow of the said river, or the continuous use thereof for power purposes or navigation at points downstream from such dam and within the State of West Virginia, in such manner, that there would be through the operation of such dam or project, any diminution of the flow of said river:

"(1) either below the natural flow of the said river whenever its natural discharge is less than its mean natural discharge, or

909 "(2) below the mean natural discharge of the said river whenever its natural discharge exceeds its mean natural discharge."

By Mr. THOMPSON:

Q. Major Trippe, you were ordered by the Chief of Engineers to make an investigation of New River under the Declaration of Intention of the Appalachian Electric Power Company?

A. Yes, sir.

Q. Did you proceed to do so?

A. Yes, sir.

Q. Who was the Chief of Engineers at that time?

A. I believe, General Taylor.

Q. Do you know whether or not General Taylor made a report in regard to the Declaration of Intention?

A. To the Federal Power Commission?

Q. Yes, sir.

A. I have seen a letter making his report; yes, sir.

Q. I hand you Government's Exhibit No. 93, and ask you what that is?

A. This is a report made by the District Engineer at Huntington, West Virginia, July 23, 1925, on the Declaration of Intention.

Q. And do you know whether or not that accompanied the report of the Chief of Engineers?

By Mr. JACKSON. The report of the Chief of Engineers to where?

By Mr. THOMPSON. To the Federal Power Commission.

By Mr. JACKSON. I object to the question. This witness could not know that except by hearsay, as to whether or not it was received.

By Mr. THOMPSON. He has been to the Federal Power Commission time after time and seen the files there.

910 Q. Who signed this report?

A. Major Lyman.

Q. Who is Major Lyman?

A. I took my annual leave during the months of July and August 1925, and Major Lyman was District Engineer at Cincinnati, and he was assigned to the district while I was on leave; he was assigned by the Chief.

Q. Had you been preparing the data before you left?

A. Yes, sir.

Q. And you turned the data over to him?

A. Yes, sir.

Q. State whether or not this report of his coincides with your views?

By Mr. JACKSON. We object to that as immaterial and irrelevant and incompetent. They cannot build up evidence by bringing in documents and asking the witness to make a case for them.

By Mr. THOMPSON. Here is a series of events. The Chief of Engineers called on Major Trippe to make an investigation under the Declaration of Intention. He proceeds to make the investigation under the Declaration of Intention and the report is signed by Major Lyman, and I desire to get an explanation from the witness as to why Major Lyman signed it.

By Mr. JACKSON. That is all right.

By the COURT. And whether or not it modifies—as to whether it embodies the result of the investigation of this witness?

By Mr. THOMPSON. Yes, sir. Because he gathered the evidence and submitted it and Major Lyman signed the report. Read the question. (Question read.)

By Mr. JACKSON. We renew our objection to the question in that form. It seems to me that it is wholly inadmissible to call a witness and ask him as to whether or not his opinion coincides with someone else's. It might be on cross-examination but not here.

By Mr. THOMPSON. He has already testified that he turned it over to Mr. Lyman, after he collected the data himself. Mr. Lyman probably made such use of it as it appeared to him proper. I don't know what that was.

Q. This is the report signed by Major Lyman and summarizing the information you had gathered, is it?

By Mr. JACKSON. We object to that. He should not be permitted to give that kind of testimony. If it is competent, how could we check that?

By the COURT. If it is the same report he made, or based on information he gathered and that he says it contained and information that he required, I think it is all right.

By Mr. THOMPSON:

Q. Is this report based on evidence that you gathered, or data?

A. Yes, sir.

Q. Does that contain data that you gathered in response to the order of your Chief?

By Mr. JACKSON. We object to that as immaterial and incompetent. May I have my exception.

By the COURT. Yes, sir; the objection is overruled and you may have your exception.

By Mr. THOMPSON:

Q. What is the customary procedure when a request is made for an investigation by the Federal Power Commission, to the Chief of Engineers, so far as consulting the district office is concerned?

A. I didn't get that—the Federal Power Commission?

Q. No; when the Federal Power Commission requests the Chief of Engineers to make an investigation?

A. The procedure generally is that the Federal Power Commission asks the Chief of Engineers to make a report on their investigation. They would direct the district engineer to make up the investigation and a report to the Chief.

By Mr. Jackson. Who is "they"?

A. I thought I said "he." The Chief of Engineers would direct the district engineers to do so and he would—the district engineer would then make his report to the chief of engineers, through the district—I mean through the Division Engineer. Generally the Division Engineer puts his endorsement on it.

Q. After you made, or Major Lyman made his report on August 20, 1925, when were you next consulted with respect, if at all, with respect, to any investigation of the Applachian Electric Power Company project?

A. I made a formal investigation of the application for license—the Declaration of Intention.

911 Q. No; later on.

By Mr. JACKSON. Is it on the Declaration of Intention?

By Mr. THOMPSON. No, sir.

By Mr. JACKSON. What is it?

By Mr. THOMPSON. The application for license.

By the WITNESS:

A. I made an investigation and report that I have already testified about on the application for a license.

Q. I didn't know that you had testified as to that.

A. In the public hearing I was talking about.

Q. You mean that investigation?

A. Yes, sir.

Q. I hand you Government's Exhibit No. 97, being the report of Major General Taylor, to the Executive Secretary of the Federal Power Commission, and ask you if any request came to you to make an investigation—this is dated December 29th, 1925—if any request came to you from the Chief of Engineers to make an investigation of the application for license.

By Mr. JACKSON. We object to that as immaterial, irrelevant, and incompetent.

By the COURT. What is your objection?

By Mr. JACKSON. It doesn't make any difference if a request was made to the District Engineer to make the investigation or not. There are only two possible issues here in this phase of the case. One is what was before the Commission as a justification for their action. We say that it could only be what was before it at a formal hearing. They cannot bring evidence here which may be on a question of jurisdiction or constitutionality which are matters to be determined by your Honor in this case. As to the letter, I am of the opinion that testimony of this character would never have any relevancy. I don't see how it could be relevant to show whether the District Engineer was ever asked to make an investigation and a report.

By the COURT. This particular question more or less develops evidence that is negative evidence, more or less, if he answers as I anticipate.

By Mr. JACKSON. I have perhaps confined byself to too narrow a point. The only pertinent testimony can be what official reports were prepared in the field and brought to the attention of the Commission, and here we have the alternative of some personal report of an officer before the Commission advising them orally. It would involve an entirely collateral matter, whether or not the District Engineer made a report on the basis of information collected by him, and he could not possibly know what

influenced the other Engineers and whether the other Engineer made further investigations and reports cannot be material. If he made a report, it can be produced and identified, and if it is competent, that can be decided by you, but it is not appropriate to do so in this way and to build up evidence by a series of reports of this kind, and it seems to me to be utterly incompetent and wholly irrelevant, and I feel so strongly about the point, I think it is my duty to preserve these objections in the record, and that I would not be doing my duty if I did not preserve the record in this way.

The COURT. I don't want to interpret the purpose of the plaintiff here, but, as I understand, what they are seeking to establish is this: Assuming, first, that the statute directs the Commission to make an investigation or have an investigation made, in this instance, and I presume in other instances, it did it through the agency which was readiest and handiest to do it, and in a position to do it, an agency that had a great deal to do with the waters of the country in one way or another, that is the Corps of Engineers of the United States Army, and it asked the Chief of Engineers to have this investigation made. The Chief of Engineers made a report. Now, they seek to prove that that report was based on an investigation that was actually made, not that the Chief of Engineers, in his office without any data or information at all, made a report, but they want to show that the investigation was carried right down to the field, right down to the banks of the river, and hearings were had and all that sort of thing.

Mr. JACKSON. If your Honor please, if the course of the examination were directed to asking this witness what examinations he had made at the direction of the Chief of Engineers, and what reports he had made and identifying those, I think it would follow that the situation would be as your Honor has just suggested. The attempt here is to show that the District Engineer was not asked to make as many investigations as Mr. Thompson or somebody thinks he could have been asked to make, and therefore an attempt, I presume, to impeach or otherwise discredit reports of the Chief of Engineers, the superior officer of this witness.

The COURT. I think that last objection applies more particularly to this last question. What the purpose of that is, I don't know. He may answer.

Mr. JACKSON. May our exception be noted.

Q. (The question was read as follows.) I hand you Government's Exhibit 97, being the report of General Taylor to the Executive Secretary of the Federal Power Commission and ask you if any request came to you to make an investigation under that—dated December 29, 1925, if any request came to you from

the Chief of Engineers to make an investigation of the Declaration of Intention.

A. I don't recall any; no, sir.

Q. Did you gather any data and forward it to him with respect to the report of December 29, 1925?

A. I don't recall any.

Q. Did you know anything about the report of December 29, 1925, having been sent out by the Chief of Engineers until after it was sent?

A. I knew nothing about it until I saw a letter later.

Q. When is the last time you have seen the original report of the Chief of Engineers, if you recall, of December 29, 1925—what approximate time?

A. You mean this report addressed to the Executive Secretary?

912 Q. Yes.

Mr. JACKSON. May our objection be noted to the competency and relevancy of this question?

By the COURT:

Q. These hearings that you testified to having been held, I think you said at Radford and other places, and notices published in newspapers in several states and the appearance of all of these parties objecting, were when?

A. Two of them were in January 1925.

By Mr. THOMPSON. Not with respect to this particular Declaration of Intention. Those were with respect to other investigations on New River by different applicants. He is now referring to the one at Radford.

By Mr. JACKSON:

Which was not on a Declaration of Intention.

A. It was an application for license.

By Mr. THOMPSON:

Q. What was the date of that?

A. October 28, 1926.

Q. And at that time you hadn't made any report, had you, on the application for a license?

A. No, sir.

By Mr. THOMPSON:

Q. State whether you ever made a report on the application for a license.

A. Yes, sir.

Q. When did you make that report?

A. December 22, 1926.

Q. And what course of procedure did that report take?

A. I addressed it to the Chief of Engineers, Washington, D. C., through the Division Engineer at Cincinnati, Ohio.

Q. I hand you Government Exhibit 98, and ask you if your report is contained in that exhibit?

A. Yes, sir.

Q. And what else is contained in that exhibit?

913 A. Duration curve.

Q. State whether the report of Gen. Deakyne is in that exhibit?

A. First, endorsement by the Division Engineer, the report of the Acting Chief of Engineers to the Executive Secretary of the Federal Power Commission dated April 12, 1927.

Q. I believe I asked you a while ago when I was interrupted when you last saw the report of December 29, 1925, signed by General Taylor?

A. Sometime within the last two months, I believe.

Q. Where did you see it?

A. In the office of the Chief of Engineers, in the files.

Q. I hand you Government Exhibit 98 and ask you to have reference to your report on page 20, and state whether you made any recommendation in that report?

A. "It is recommended that the license be granted.

"26. Special conditions.

"It is recommended that the following provisions be inserted in the license: The licensee shall furnish detailed plans of all structures when such plans are completed for approval by the Federal Power Commission. The licensee shall establish and maintain a stream gauging station with automatic recording gauge in New River above the reservoir created by the project works. The licensee shall clear the reservoir area of all trees and brush between elevations 1830 and 1841 to the satisfaction of the Secretary of War and the Federal Power Commission. The licensee shall pass continuously through its dam, during and after construction, a flow not less than the minimum natural flow as determined from a gauging station to be established by them in New River above and sufficiently close to the reservoir created by project works.

"5. The operations of the licensee, so far as they affect the use, storage and discharge from storage of the waters of New River, shall at all times be controlled by such reasonable rules and regulations as the Secretary of War may prescribe in the interest of navigation and as the Federal Power Commission may prescribe in the interest of flood control, damage to other interests and for the fullest practicable utilization of the waters of the said river for power purposes."

914 Q. That went forward with Gen. Deakyne's report, did it not?

A. Yes.

Q. To the Federal Power Commission?

A. Yes.

By the COURT:

Q. Did you discuss with any of the officials of the Appalachian Electric Power Company the substance of your recommendations before you made them?

A. Did I discuss it with them?

Q. Yes.

A. I believe I did, sir; although I can't testify exactly.

Q. Did they indicate a willingness to comply with the conditions that you recommended?

A. I wouldn't say that; no, sir.

Q. Do you know whether or not any license was ever tendered them embodying those conditions?

A. I do not.

By Mr. THOMPSON:

Q. During your investigation of this application for a license and Declaration of Intention, did you ever visit the Federal Power Commission?

A. Yes, sir.

Q. Did you ever have any conferences with Major Edgerton?

A. Yes, sir.

Q. Where did you have them?

A. I had one in the Federal Power Commission in January or February of 1926, and Major Edgerton visited the Huntington office, I believe in October 1925.

Q. Do you recall whether you had a conference with him after the hearing that took place at Radford—in Washington?

A. That would be October 28, 1926. I do not recall it.

Q. Did you make any study of the documents on file in the Federal Power Commission that had related to New River and Kanawha River?

A. In the Federal Power Commission?

915 Q. Yes.

A. I do not recall making any study of any documents that I didn't have at Huntington.

Q. You had mostly duplicate copies of the documents?

A. Yes.

Mr. THOMPSON. Yesterday counsel raised a question as to our not having put in evidence a document, that is all of the letters that had to do with the permit at the Glen Ferris Dam and the permit for the construction of what is known as the Kanawha

Falls Dam or the Glen Ferris Dam. I read the record over last night. What I was trying to do was to shorten this record, but evidently in attempting to do so I have not made this as clear as possible, so counsel objected at the time and said that all of these letters, all of the correspondence, ought to be here.

Mr. JACKSON. My objection was that there were two things included in your exhibit. One was the proceedings leading to the issuance of a permit dated February 27, 1899, and another entirely separate thing was a letter by an entirely different company dealing with the request for permission to make repairs, which letter is dated in 1919. My objection was that the letter of request and the pertinent documents or reports of the Engineering officer as to each of those separate transactions should all go in if either one of the transactions is to be offered in evidence, but I can bring that out on cross-examination.

Mr. THOMPSON. We are perfectly willing at this time to substitute the complete correspondence, together with the permit, for the exhibit which we introduced yesterday, and I offer to do that now at this time.

The COURT. That relates to permission to construct the dam in 1899?

Mr. THOMPSON. Yes. And then the subsequent correspondence where the permit was granted to change the form of the dam, and I ask that this document which I now offer be designated as Government Exhibit 123-A. I think the other one was Exhibit 123.

Mr. JACKSON. We have no objection, your Honor, to the amplification of Exhibit 123 by Exhibit 123-A, but we don't wish to be understood as waiving our objection.

The COURT. You don't waive your objection.

Mr. JACKSON. We don't waive our objection to either one.

916 H. M. TRIPPE

Direct examination by Mr. THOMPSON:

Q. Colonel, will you please state to the court whether in your investigation, under the application for a license by the defendant or at any other time, you made a study of the wave conditions on New River?

A. Yes, sir; I did.

Q. Please state to the court what you did in that study.

A. It was in 1926, and in order to determine, if possible, the effect of a wave from the proposed plant at Radford, I started an investigation on the waves in New River. At that time it was possible to get the wave from the Buck and Byllesby plant about forty miles above Radford when they would shut the water off and then open it up again. I had a man take charge of this

ork who posted observers down the stream at intervals, if I emember correctly, of about fifty miles and he took gauge heights. ach observer took the gauge heights. As I recall it, there was o rating made of the stream at these points so there was no ossibility of converting these gauge heights into actual flow. he experiments were made with waves, as I recall it, of some- here between two and three thousand second feet ordinarily, nd the waves were of comparatively short duration and there- re of a rather limited volume of water, nothing like the fluc- ations that would occur or that could occur with the Radford am in operation and the installation proposed to be made there. t was simply an attempt made to determine if waves persisted for ng distances down the stream.

Q. And what was your conclusion so far as you went in this udy?

A. The experiments were very valuable, but they were not in fficient number or of sufficient volume of water to make a formal eport and deriving a definite conclusion. I did recommend that further studies be made to amplify the information we already had. The trouble with the experiment or some of the troubles were that the waves were started approximately rty miles above the proposed dam at Radford. The weather nditions were not very favorable during the time the experiment account of a great deal of rainfall in the mountains. The aves were definitely traceable at least ninety-five miles down, nd some of them were traceable on a chart down to the Kanawha iver. There were frequent interruptions from rain which would pparently either make the wave bigger or wipe it out. It couldn't e determined because we had no rating tables but the storms did terfere considerably. The experiments were very valuable as owing tendencies.

Q. They were not sufficiently complete to be satisfactory?

A. No, sir.

Q. I hand you Government Exhibit No. 94, and ask you hether that is your signature on there?

A. Yes, sir.

Q. And what is Government Exhibit 94?

A. This is a letter that I wrote to Major Edgerton, enclosing memorandum on the effect of navigation of proposed New iver Development Company project on New River near adford, Virginia.

By Mr. THOMPSON:

Q. Colonel, I ask you whether during the low water periods at you testified to yesterday in the year 1925 in the Kanawha ver it was necessary to caulk the wickets on the dams in the anawha River?

A. Yes, sir; it was.

Q. And was the same condition true on the Ohio River?

A. Yes, sir.

Mr. JACKSON. I object to any testimony with reference to the conditions on the Ohio because it is not included in the complaint. There is no complaint in the bill with reference to the Ohio River.

The COURT. The objection is overruled.

Mr. JACKSON. I note an exception.

Mr. THOMPSON. I offer this document in evidence also as having been prepared by Col. Trippe and as having been sent to the Federal Power Commission or rather to Major Edgerton who was then Chief Engineer of the Federal Power Commission.

Mr. JACKSON. It has already been offered and we interpose the same objections that we interposed before.

By the COURT:

Q. When was the report made?

A. October 15, 1925.

Mr. THOMPSON. It has already been in evidence.

918 By the COURT:

Q. Following the Declaration of Intention?

By Mr. THOMPSON:

Q. Was that after the date of the Declaration of Intention?

A. I believe so.

Q. Was it later than the filing of the application for a license, if you know?

A. It was prior to that.

By the COURT:

Q. What I am getting at is this, whether the matters embodied in that report went before the Commission as a part of the investigation which it was making on the Declaration of Intention or whether it had that report before it and considered it as a part of the investigation? Was it made for that purpose?

A. I cannot answer that question. I sent it to Major Edgerton.

Mr. JACKSON. I want the record to show that we have fairly invited the court's attention to the fact that our objection to this particular exhibit 94 which was urged when it was offered through Col. Edgerton was that this exhibit is not an official report in the ordinary course of official business and through the regular official channels. That was brought out before, and I thought that it being an unusual type of objection, I should state it again.

Mr. THOMPSON. We have shown since the testimony of Major Edgerton that Major Trippe, responding to the order of his Chief,

, in turn, was responding to the order of the Federal Power mmission, made this investigation and that this document we offer is one which was sent to Major Edgerton to advise him, ough the agency of the Chief of Engineers or through Major ppe, acting for the Chief of Engineers, as to the situation that found over there.

he COURT. As a part of that investigation.

Ir. JACKSON. Of course, to keep the record straight, the Chief Engineers never instructed Col. Trippe to make this report never instructed Col. Trippe to make any report, so far as record shows, on the Declaration of Intention to Col. Edger-, or directly to the Federal Power Commission. Of course, nstructed the Colonel to make his investigations and reports in regular course as Chief of Engineers who was responsible for at might be the ultimate advice given to that Commission, and was not handled in that way, but I suggest that Col. Edgerton t into this very fully, and it appears from his testimony just at was done with Exhibit 94. It was sent to him by Col. ppe, and I see no reason for inquiring further about it from . Trippe, who obviously doesn't know what Col. Edgerton did h it.

he COURT. I don't think Mr. Thompson was inquiring about t. The court was inquiring about the nature of it. I did not ember Colonel Edgerton in connection with it. All I wanted now was whether that report contained matters that went be- the Commission as a part of its investigation or whether it considered by them as a part of the investigation and whether le for that purpose or not.

Ir. THOMPSON. That was so testified by Col. Edgerton.

Ir. JACKSON. We will point it out in the record. Col. Edgerton l he couldn't say that it went before the Commission.

By the COURT:

. Major Trippe, you spoke of some experiments, sending waves vater down the stream. How did you accumulate the water to duct those experiments?

. The Appalachian Power Company cooperated with us in giving us access to their records, their flow records at their two dams, and, as I recall it, when they were going to run their generators with water we would get a record of their through the turbines and then we had observers who took rvations during the 24 hours, and we could trace those waves n the river. The reason I did that was because, if I may say , on the Ohio River during the dry years from the war until dams were completed, it was customary to make coal waves,

what we call coal waves in order to get coal down the river. I was quite familiar with the transmission of waves through pools and through ordinary river channels where the dams were built, and, for that reason, I wanted to find out what would happen in a stream that had no dams in it.

Q. As a result of those experiments, have you any data as to the time interval between the dams above Radford and Kanawha Falls, how long it would take the water to get down?

A. I had a plat made of the results; yes, sir. I haven't it with me, but I have that information.

By Mr. THOMPSON:

Q. Passing from your study and investigation of the Declaration of Intention and from your study of the application for a license and the evidence which you considered, I now call your attention to your recommendation which you made in your report of December 22, 1926, which accompanied the report of Gen. Deakyne to the Federal Power Commission in which you recommended that a license shall be issued upon condition that there pass through the dam not less than the minimum natural flow as determined from the gauging station to be established in New River above and sufficiently close to the reservoir, and then I call your attention also to the final concluding paragraph of General Deakyne's report (Government Exhibit 98, 3rd page) which is as follows: "The licensee shall at all times discharge a minimum of 8,050 acre-feet per week over or through the dam. Whenever the flow at Lock No. 2, Kanawha River, falls below 1,400 second-feet, the licensee, when so directed by the Secretary of War, shall
920 discharge in each 24 hours the minimum flow of the river during that period up to a discharge of 1,150 acre-feet. The above discharge shall at all times be regulated by such rules and regulations as the Secretary of War may prescribe to prevent interference with the navigation on the Kanawha River." I would like to ask you what was the reason for your making the recommendation which you did make.

Mr. THOMPSON. I can separate the question and ask him then why he recommended that a license be issued upon condition that there pass through the dam not less than the minimum natural flow as determined from a gauging station to be established in New River above and sufficiently close to the reservoir.

A. The reason for that recommendation was that under existing conditions the total low water flow of New River was not sufficient for navigation without interfering with it. Therefore, if anything less than the minimum flow itself or any more water was held back by any project it would seriously interfere with navigation.

By the COURT:

Q. You say the minimum flow itself?

A. The minimum flow itself was not sufficient to maintain navigation without difficulty. Dam No. 4 in September of 1925 was considerably over a foot below the crest of the dam for a long period of time, in spite of everything that we could do to bring the pool back.

Q. Which dam is that you are speaking of?

A. Dam No. 4.

Q. Where is that?

A. It is the third dam from Kanawha Falls down Kanawha River. It is the first movable dam.

Q. In other words, you say you thought the minimum flow of New River in its natural state was not sufficient to maintain navigation under then existing conditions?

A. I know it was not.

Q. And you didn't want it further interfered with?

A. That is it, exactly.

By Mr. THOMPSON:

Q. State whether or not the natural flow of the Kanawha River was necessary for navigation on the Ohio River during the year 1925 below the confluence of the Kanawha and the Ohio Rivers?

Mr. JACKSON. May we have our objection noted that that question is not within the issues presented by the bill of complaint and I think under your Honor's previous ruling——

The COURT. On what theory?

Mr. JACKSON. As I read the bill, the only claim of interference with navigation made by the Government is on the Kanawha River and I don't understand that any claim is made of interference with navigation on the Ohio in the bill.

The COURT. I am frank to say I don't recall whether it is or not.

Mr. JACKSON. I therefore make my objection and if the court feels it should be over-ruled, I would like to note the exception.

The COURT. I think I will over-rule it.

Mr. JACKSON. We note an exception.

The COURT. We all know the course of these rivers, that the New runs into and becomes the Kanawha and the Kanawha runs into the Ohio and we also know that in flowing water the effect is felt everywhere pretty near, where the water flows, to a more or less extent. I don't think we will confine it merely to the effect on navigation on the Kanawha or lowering the height of the Kanawha River if it does have an appreciable effect on the waters below that.

Mr. JACKSON. May I make this statement: I want to make it clear that my objection was based upon no such technical consideration as to whether there is an allegation that the Kanawha flows into the Ohio but in our minds, at least, it is perfectly fanciful to suggest that any effect is discernible upon the Ohio and, as far as we read the bill of complaint, no such claim has ever been advanced and it is on that basis that we have prepared the defense of this suit.

The COURT. But, Mr. Jackson, it is conceded, I take it that the Kanawha River is navigable waters.

Mr. JACKSON. It is conceded, at least under present conditions, that the Kanawha River is a navigable water of the United States from its mouth to a point ninety miles above.

The COURT. The flow of New River affects the navigability of the Kanawha and I don't think you are hurt at all by showing that effect may still be transmitted down to the Ohio to some extent because it is certainly a lesser extent. As it goes on into the larger streams the importance of the flow of New River is minimized and you might carry it on to the Mississippi, and I suppose by that time the effect of New River would be dissipated completely, but you can't be hurt by showing a slight effect on the Ohio if there is at the same time shown an appreciable effect on the Kanawha. I will let you answer it.

Q. (The question was read as follows:) State whether or not the natural flow of the Kanawha River was necessary for navigation on the Ohio River during the year 1925 below the confluence of the Kanawha and the Ohio Rivers?

Mr. THOMPSON. And I might add—during the low water periods of 1925.

921 A. Yes, sir; it was very necessary. The dams were all movable below the mouth in the Huntington district from Dam 26 to 31, inclusive. 32 was not completed. It was open river navigation at that time. It was very necessary and it was necessary to caulk all the dams from 26 to 31 to maintain the pool with the water then flowing.

Q. And that included all the water coming down the Kanawha River?

A. Included all the water from every source.

Q. Will you please state whether or not in your opinion the flow of New River is necessary for navigable purposes on the Kanawha and Ohio Rivers?

A. Certainly.

Q. Why do you say that?

A. Kanawha and New River are practically one river, but different names though.

Q. State whether or not in your opinion if the flow at New River was interfered with for any length of time, by cutting off the flow from the Radford project, it would affect navigation on the New, Ohio and Kanawha Rivers?

By Mr. JACKSON. I object to that question, because it assumes there is navigation on the New River, and I think there is no proof of that, and I further object to the form of the question because it uses the word "affect" which is the legal form of the Federal Water Power Act, and I think involves a legal conclusion. I think the question should be more accurately framed, if admissible at all.

By the COURT. He may answer, although I think the question as Mr. Jackson says, assumes there is navigation on the New River.

By Mr. JACKSON. I object further because the question does not state with any degree of accuracy so the question is understandable, the period of time during which it assumes the flow is cut off, the duration of the period of time, or the physical conditions on the Kanawha River, and then I would like to note my exception to the ruling of the Court.

By the COURT. All right. That can be developed on cross examination.

A. As I understand that question, would the construction of a dam as proposed, interfere with navigation on the New and Kanawha Rivers?

By the COURT:

No, he asked you if you cut off the flow of New River above Radford, would it affect navigation?

A. I believe I have already answered that, that it would, yes, sir.

Q. I will ask you whether prior to the request by the Chief of Engineers that you make an investigation of New River upon the Declaration of Intention of the Appalachian Electric Power 22 Company, you had any other request by the Chief of Engineers to make an investigation of the Radford project?

A. Yes, sir.

Q. I hand you, marked for identification, Government Exhibit 126, dated May 28, 1925, and addressed to Major General H. Taylor, and signed by C. B. Slemp, and ask you if you know what that is?

A. It is a letter written to Major General Taylor by C .B. Slemp, dated May 28, 1925, received in the Huntington office on July 3, 1925.

(Exhibit 126 offered in evidence.)

Q. Will you read that letter now Col. Trippe?

A "I am sending herewith letter from Mr. Buck which is in accordance with our conversation recently. We will be glad to furnish any further information desired at any time. Thanking

you for your kindness and courtesy in the matter, I am, Very truly yours, C. B. Slemp."

Q. The letter refers to an enclosure. I hand you three pages of a photostat letter, signed by Viele, Blackwell & Buck, by H. W. Buck, Engineers for New River Development Company, and ask you whether you have ever seen this before, as well as the map also enclosed?

A. The letter was received in the Huntington office on June 3, 1925, and I saw it there, while the map is not stamped with our office stamp it is referred to in the letter, and I have seen the map.

Q. You have seen it before?

A. Yes, sir.

Q. Is that the enclosure referred to in Exhibit #126 for the Government?

A. Yes, sir.

(Exhibit 126a, being letter dated May 27, 1925, from Viele, Blackwell & Buck to Gen. Taylor and exhibit 126B, being map No. R-7656 referred to in exhibit 126a (enclosed with exhibit 126) were offered in evidence.)

Q. What is Government's Exhibit #127, Col. Trippe?

A. It is the first instruction from the Chief of Engineers to the District Engineer at Huntington. I will read it:

923 "Subject: Project on New River. It is requested that the District Engineer submit report as to what effect, if any, the power development discussed in the inclosed communication will have on the navigability of the New River and its effluents, and whether, in his opinion, there is any objection to the construction of the project without Federal jurisdiction."

Q. That was received was it not June 3, 1925, by the office at Huntington?

A. Yes, sir.

(Exhibit 127 offered in evidence.)

Q. Col. Trippe, I hand you a photostat consisting of two sheets, and marked for identification. Government Exhibit #128, "Subject: Project on New River, Va.," signed by H. M. Trippe, and ask you if you know what that is?

A. Yes, sir; that is my reply to the letter of the Chief of Engineers, just referred to.

Q. What is the date of that letter?

A. June 15, 1925.

Q. And that was before your office had any notice of any Declaration of Intention being filed with the Commission by the New River Development Company, was it not?

A. That is correct.

By Mr. THOMPSON. We offer that letter in evidence.

By Mr. JACKSON. May I ask a question before the offer is passed upon?

By Mr. THOMPSON. If he is going to ask about the contents I will object.

By Mr. JACKSON. Perhaps you can tell better when you hear my question.

By Mr. JACKSON:

Q. Col. Trippe, is it a fact that Exhibit #128, being your report and reply to the direction of the Chief of Engineers, was transmitted through your Division Engineer, Col. Kutz, was it not?

A. Yes, sir.

By Mr. JACKSON:

Q. And is it not also a fact that in the regular course of that official report it bore the endorsement of your Division Engineer, C. W. Kutz?

A. It should, when it left my office I mailed it to the Chief of Engineers through the Division Engineer, and it was customary for him to put his endorsement on it.

924 Q. I hand you a single photostat sheet marked for identification, Government's Exhibit #129, signed by Col. C. W. Kutz, Subject, "Project on New River," and ask you if you know what that is?

A. Yes, sir, my reply was headed "2nd Ind." and this is "3rd Ind." to the Chief of Engineers.

(Exhibit 129 offered in evidence.)

Q. I now read from paragraph two: (Government's Exhibit #128.)

"In view of the proposed increase by the construction of this power project of approximately 500 second feet of the low-water flow of the New River, the proposed project would in no way interfere with navigation on the Kanawha River which is formed by the junction of the New and the Gauley Rivers and which is canalized for the greater part of its length by the construction of locks and dams. The said project would on the other hand be a benefit to navigation on the Kanawha River if the low-water flow be augmented as proposed.

"3. As to the proposition of the New River Development Company that they be permitted to construct the proposed development without Federal jurisdiction, it is not seen how this can be permitted for two reasons: first, the New River while not navigable in fact is legally a navigable stream, the Government in the past having expended moneys on this stream for channel improvement; second, because of the fact as previously stated that the New River is considered a navigable stream it would be

inconsistent with the policy that has prevailed in the past to require power developments on this stream to be under the jurisdiction of the Federal Power Commission and now permit the project here under consideration to be constructed without such jurisdiction. The following proposed developments for water power on the New River have been projected since the enactment of the Federal Water Power law and have been considered as coming within the jurisdiction of the Federal Power Commission." And then gives the list of four projects.

"4. It is, therefore, the opinion of this office that the proposed water-power project of the New River Development Company will be no obstruction to navigation but rather a benefit provided the low-water flow of the river be augmented as proposed and that there is no objection to proposed development from the standpoint of its influence on navigation.

"5. In view of the past policy of considering the New River a navigable stream and of the fact that four previous applications for water-power development on this stream have been considered as coming under the jurisdiction of the Federal Power Commission it is not seen how the New River Development Company can consistently be permitted to construct their proposed project without Federal jurisdiction unless the stream now be declared not navigable and Federal Jurisdiction over the four previously proposed water-power projects be cancelled and all applicants for such developments be placed on the same basis."

Q. Now, Col. Trippe, I would like to ask you what you understand by this phrase in your letter or report——[interrupted].

By Mr. JACKSON. Was this a question or what was the purpose of this?

By Mr. THOMPSON. I will submit to your Honor, here is a line that is ambiguous unless we have it explained.

By the COURT. Mr. Jackson asked, what was the purpose of reading the letter or what is the question connected with reading it?

By Mr. THOMPSON. As to his understanding. He is an expert—as to what navigable water is.

By the COURT. Ask him first if he wrote that letter?

By Mr. THOMPSON. I did.

By the COURT. Now you want to ask something in connection with it?

By Mr. THOMPSON. I would like to have him interpret this phrase: "The New River while not navigable in fact is legally a navigable stream," and ask what he understood by that when he wrote it.

By Mr. JACKSON. I object to that question. I don't know what they are seeking to prove by it. They offered a document that speaks for itself. Now they cannot ask him to interpret it.

By the COURT. I think the letter indicates very clearly the witness termed it legally navigable, because some improvements had been made on it by the Government, and it was his idea that, in law, made it a navigable stream.

By Mr. JACKSON. I also object because there is no ambiguity in the report.

By the COURT. He may answer.

By Mr. JACKSON. May our exception be noted.

I don't want to be a nuisance, but I want to know the purpose of this report, and what it is offered for? I repeat there is an attempt here to make affirmative evidence by bringing along a witness and ask if some report he has made states his view—and I think this calls for not only the interpretation of an unambiguous instrument, but a legal interpretation of the witness.

By the COURT. I will let him explain what was in his mind when he drew a distinction there.

By Mr. JACKSON. May our exception be noted?

By the COURT. Yes, sir.

A. I will have to explain to some extent on this. The phrase I used "was not navigable in fact" is that at the time this report was written, there was no commercial navigation, at least to any extent, in existence on that river. There had been previously commerce on that river. If I might illustrate by a condition in some of the ports on Lake Michigan, where sailing vessels carried commerce to a very large extent, the Government spent money improving those harbors. I have one case in mind where the Government built parallel piers, and commerce was carried on, and when the lumber commerce stopped commerce stopped, and then you could walk across with dry feet; and it is quite probable that other traffic will develop in the future, and the Government can simply go in and dredge that out and restore navigability. The Fox River is navigable water by the U. S. Supreme Court decision, and at the present time it is only possible to go through the four-foot project of boat drawing, one foot of water will strike bottom going through that, but it is simply necessary to dredge it
926 out to have commerce resumed. That is what I meant by the statement, the river while not navigable in fact it is legally a navigable stream; as I understand the matter, when Congress has assumed jurisdiction over a navigable water, the only way they relinquish that is by a specific definite act of Congress.

By Mr. JACKSON. I move to strike out the answer on several grounds: (1) The witness, in his direct testimony, undertakes to draw into the case about the Fox River and the Great Lakes, and of course, I think it is too well settled to require comment that an expert witness cannot give testimony about other situations on

his direct examination, or we would never get through, but wo
be trying to determine the conditions there.

By the COURT. The witness is always entitled to explain
statements. The Court doesn't necessarily accept those.

By Mr. JACKSON. I wanted to make the point about bring
in these extraneous cases. The other grounds for striking it
is, I think it appears clearly, the statement is nothing more t
a legal conclusion, and so far as it relates to any conditions
this river, it would be based on hearsay and something that
pears in official reports and is the best evidence. May the rec
show our motion is overruled and exception noted?

By the COURT. Yes, sir.

Cross-examination by Mr. JACKSON:

Q. Col. Trippe, I think you said that you were District En
neer at Huntington for sometime in 1923 until sometime in 19

A. Yes, sir.

Q. And that was your only duty in that District, I take it?

A. Yes, sir.

Q. And other than such personal knowledge as you acqui
while you were District Engineer at Huntington, I assume y
information about New River is derived from official rep
and things of that character?

A. Yes, sir.

Q. In answer to question of counsel, I understood you to say
reference to conditions when you were on New River in 1925, t
the minimum flow of New River under existing conditions
not sufficient to maintain navigation at low water?

A. Yes, sir.

Q. Now, when you said under existing conditions, I assu
you referred to the conditions which existed when you were
the Huntington District?

A. That is correct.

Q. And you also said, I believe, that you thought that the f
of the Kanawha River was necessary, at low water, to av
possible interference with navigation on the Ohio River bel
the Kanawha?

A. I don't believe I said I thought so, I said I knew so.

Q. And you were, as I understand it, dealing then again w
conditions that obtained on that stream when you were Dist
Engineer and had charge of it?

A. That is correct.

927 Q. And you referred during the course of your testim
to a practice that prevailed on the Ohio River of releas
a wave or tide in order to float down tows of coal barges. W
right in so understanding?

A. I don't believe I said tide.

Q. Well a wave?

A. Yes, sir.

Q. So that you mean you impounded water, or someone did, and then released it suddenly so as to make a wave in the river below?

A. Let me explain just what happened. At that time it was customary to congregate the coal and possibly steel fleets at or near dam #26 in order to give them sufficient water to go down the river to Cincinnati, and possibly beyond. The pools were as full as they could be made by caulking the dams and holding the water back, all the pools were as full as possible, and then the Division Engineer gave the time the wave would start, the District Engineer, who was myself, at that time was responsible for carrying that wave down to #26 and carrying the fleets to Cincinnati and beyond, and in order to do that, depending on the stage of the water, it was necessary to start this wave somewhere near Pittsburgh. The last dam I had charge of was Dam #12 at Wheeling, W. Va. Sometime in the night, at a time we had determined it was necessary, the bear traps and some of the wickets were lowered, say at Dam #10 for example, then at the right time when that wave reached #11 the bear traps and wickets were lowered on that, and on down the river, so about daylight in the morning the wave would reach dam #26, and then the bear traps and wickets were kept open so the flow continued one, two, or three days, as long as that was necessary; then it was necessary to put the dams up, re-caulk them, and fill the pool; during that time the dams were not complete, navigation was practically stopped.

928 By Mr. JACKSON:

Q. Col. Trippe, at that time, as I understood your direct testimony, there were below the Kanawha a number of dams still under construction. Is that right?

A. Yes, but No. 32 was the only one in my District. Further down there were others under construction, and still further down construction had not yet commenced.

Q. So that there was a considerable stretch of open river on the Ohio?

A. Yes, sir.

Q. That project called for a series of 56 dams, I think?

A. It wasn't quite that many, but there were different projects.

Q. There was some fifty dams to canalize the Ohio River?

A. Yes, sir.

Q. And that project had only proceeded to the stage which you have described when you were District Engineer at Huntington?

A. Yes, that is correct.

Q. Do you know when they ceased the practice of sending barges down with the waves on the Ohio?

A. No, I do not.

Q. You do know they did cease that practice later on, don't y

A. I am quite sure they did.

A. And that had to do, I suppose, with the completion of p ects below so as to provide the intended canalization of the str as distinguished from the open river navigation when you w there?

A. Yes, sir.

Q. In your direct testimony on yesterday, you stated that w you were in charge of the Huntington Office there was some trou with navigation during the low water season of September 1 on the Kanawha River.

A. Yes, sir.

929 Q. And I think you said that this trouble occurred e cially at Locks 2 and 4?

A. That is my recollection, yes, sir.

Q. Am I right in understanding that in September 1925 leak at Locks on the Kanawha River, particularly above Charles was very great?

A. Yes, sir.

Q. Do you now recall that the leakage at Lock 2 for insta under 1925 conditions was on the order of eight hundred or thousand second-feet?

A. I would not be able to give you the number of second- at this time, without studying it up again, no, sir.

Q. I produce and ask to have marked for identification se sheets which are photostats of the fourth endorsement, of fifth endorsement and the six endorsement, in a series of c munications which the Government has offered in evidence Government Exhibit No. 98, and ask to have the document I h described marked as Defendant's Exhibit for identification.

(Exhibit 508 marked for identification.)

I direct your attention to this endorsement dated February 2 1927, signed by you according to this copy, and the endorsemen Colonel Kutz, which follows your fifth endorsement, and me to see if it refreshes your recollection I direct your attentio paragraph 2 of Colonel Kutz's endorsement:

"The rating curve for the U. S. G. S. Gaging Station at Dam 2 indicates leakage at this fixed dam of approximately eight h dred second-feet."

And ask you whether that refreshes your recollection as to order or magnitude of the leakage at the time you were on dut the Huntington District.

A. I presume that is correct.

930 By the COURT:

Q. How far is Huntington below Point Pleasant?

A. As I recall, it is roughly just 47 miles.

By Mr. JACKSON:

Q. Col. Trippe, I read to you from House Document No. 190, 70th Congress, First Session, being a report on the Kanawha River, West Virginia, and particularly from paragraph 41 on page 27 of your report, which is included, as you will recall, in that document, as follows:

A. (Interrupting counsel.) Is that on the report of application for license?

By Mr. JACKSON. No, this is a report on the improvement of Kanawha River.

By Mr. THOMPSON. For what year?

By Mr. JACKSON. It is Colonel Trippe's report, and is dated February 13, 1923.

A. February 13, 1923? I was not at Huntington at that time.

By Mr. JACKSON. I may have the wrong date. I beg your pardon, it appeared on top of page 18, which is marked March 14, 1927. This has nothing to do with the Declaration of Intention, or application for license, it is only, or has to do with the condition of leaky dams on Kanawha River.

A. That is from the annual report.

Q. It is also from House Document 190, 70th Congress, First Session, and is a report to the Chief of Engineers on the dams on Kanawha River. You recall that, do you not?

A. Yes, sir.

931 Q. Now, I desire to read to you the following statement from paragraph 41 of your report on page 27:

"41. Of the items of reconstruction and improvements provided for in this report, the urgent ones are those pertaining to the passes and weirs of the dams and the gates at Locks Nos. 4 and 5. The tops of the foundations and the sills, hurters, anchorages for wickets, and bridge trestles on these structures are in poor condition. Considerable difficulty is being experienced now in operating these dams and maintaining the pools. It is necessary that if these dams are to be continued in service much longer that the reconstruction be commenced at an early date."

I ask you whether or not that is an accurate description of the condition of these dams on the Kanawha River to which reference is made when you were District Engineer.

A. From ten years ago I cannot recall it, but it sounds all right, yes, sir.

Q. It is a part of your report?

A. Yes, sir.

Q. Referring again to page 2 of House Document No. 190, 70th Congress, First Session, paragraph 4 of the report of the Chief of Engineers, dated February 17, 1928, transmitting your report to the Secretary of War I direct your attention to this statement of the Chief District Engineer as follows:

"4. The District Engineer states that the four upper locks and dams, all of which were completed prior to 1887, require
932 extensive repairs at an early date. The fixed dams, Nos. 2 and 3, are built of timber cribs, and the deterioration has been so extensive that reconstruction in concrete appears necessary. In the upper approaches to the locks and in the lower guide walls the exposed tops of the timber cribs require reconstruction or capping with concrete. The practical reconstruction of the two movable dams, Nos. 4 and 5, is required."

I will ask you whether you agreed with that description of the condition of those old dams, at and prior to 1927 for several years?

A. Yes, sir.

By Mr. JACKSON:

For identification I ask that House Document No. 190, 70th Congress, First Session, from which I have just read to the witness, be marked as Defendant's Exhibit 509.

(Exhibit 509 marked for identification.)

Q. In 1925, in addition to the question of leakage, needling and caulking were necessary to maintain pool levels at the lower dams, such as Nos. 4 and 5, were they not?

A. Yes, sir.

Q. And does it not at times happen, even though the greatest care is exercised by the supervising officer, that the personnel fails properly to look after the needling and caulking as required?

A. It would happen very seldom, if ever.

Q. However, it is something that, as District Engineer, you had to watch constantly, isn't it?

A. Yes, sir.

Q. And, is it a fact that if there should be a failure of needling and caulking, of the upstream dams as soon as it should have been done, the result would be when the pool falls say two feet, the effect of caulking and needling that dam will be to
933 cut off the flow from lower dams every time until the deficiency has been made up?

A. That is correct.

Q. And then if it should happen that the upstream dam were inadvertently to fall below its proper level, through failure to needle and caulk, that would produce successive low pools for the time required to fill the upper pool and any pool below the upstream reservoir would fall below its proper level?

A. The effect would be very small. It would work out the way you say, but in caulking a dam up it is such a slow progress it would extend over a long period of time.

934 Q. It would not be an abrupt cutting off of the flow?

A. No, sir.

Q. Now you stated that your principal trouble in 1925 was with locks and dams 2 and 4. Are those locks and dams any longer in existence?

A. No, sir.

Q. Am I right in understanding that Dams 2, 3, 4, and 5 have for some time been superseded by London and Marmet Dams?

A. Yes, sir.

Q. And the old dams have been removed, or removed so far as necessary, I take it?

A. Yes, sir.

Q. Am I also right in understanding that the following wicket dams on the Kanawha River, to-wit: Dam 6, 7, 8, 9, 10, and 11 will be superseded by the Winfield Dam and the Gallipolis Dam now under construction?

A. Yes, sir.

Q. Am I also right in understanding that the London and Marmet Dams are concrete roller-gate dams?

A. Yes, sir.

Q. Am I right in understanding that the Winfield Dam and the Gallipolis Dam are severally being constructed as concrete roller-gate dams?

A. Yes, sir.

Q. And is it not a fact that the quantity of leakage through a concrete roller-gate dam is very much less than through a wicket dam?

A. If properly constructed; yes, sir.

Q. You say, if it is properly constructed?

A. Yes, sir.

Q. You have no question but that the London and Marmet Dams were properly constructed, have you?

A. No, sir.

935 Q. Nor have you any question that the Winfield and Gallipolis Dams are being properly constructed?

A. No, sir.

Q. Isn't it a fact that the amount of leakage through a concrete roller gate dam, such as London and Marmet is very much less than the quantity of leakage through a crib and rock dam, such as old dams 2 and 3.

A. Yes, sir.

Q. That would be true, even through the crib and rock dams had not deteriorated, that is, the concrete new dams would have less leakage than rock and crib dams? Is that right?

A. Not necessarily. You could build a crib dam that 'ould have very little leakage if properly constructed.

Q. I believe I am right in saying that the quantity of leakage through a concrete roller gate dam, such as London and Marmet, would be very much less than the quantity of leakage which prevailed through old type fixed dams at Locks 2 and 3, on the Kanawha River, in 1925?

A. Yes, sir.

Q. When you referred to a "little leakage" of dams on a stream of the width of the Kanawha, could you give some idea of the order and magnitude of a leakage which you would regard as "little leakage"?

A. I don't think I quite get that question.

Q. I was just asking you to give a rough idea of what a "little leakage" would mean to an engineer in cubic feet per second.

A. That is rather hard to give.

Q. You could not give that?

A. No, sir.

Q. With a wicket type dam such as are some of the old dams on the Kanawha that are to be replaced and some of the dams on the Ohio, could the leakage without needles in place exceed as much as two thousand second-feet?

A. Yes, sir.

936 Q. Now to summarize the condition which you describe as existing in September 1925, on the Kanawha River, Colonel Trippe, is it not a fact that the principal loss of water or leakage which resulted in the dropping down of pools was caused by the condition of the dams?

A. Partly so. Any wicket dam leaks, no matter what you do to it.

Q. I am not talking now merely about a wicket dam, I am talking about the deteriorated condition of these particular dams above Charleston on the Kanawha.

A. The two fixed dams, yes, sir.

Q. They were in bad condition?

A. Yes, sir.

Q. And had this large leakage?

A. Yes, sir.

Q. And isn't it also true that Dams 4 and 5 which were wicket dams, were in bad condition?

A. Yes, sir.

Q. And isn't it also true that they had a great deal of leakage other than what might be incident to the difficulties of needling or caulking?

A. That is rather hard to answer. No matter how good the dams were, there is a considerable leakage in a wicket dam.

Q. I produce a letter, consisting of two sheets dated February 25, 1927, written on the stationery of the U. S. Engineering Office, Huntington, West Virginia, addressed to F. W. Scheidenhelm, and purporting to be signed by H. M. Trippe, Major Corps Engineer, District Engineer, and ask to have it marked for identification, Defendant's Exhibit 510.

(Said letter is marked for identification Defendant's Exhibit 510.)

Q. Col. Trippe, I show you Defendant's Exhibit 510 for identification, and will ask you whether you can identify that as a letter which you write to F. W. Scheidenhelm?

A. That is my signature; yes. That is a letter I wrote to him, yes.

Q. I take it from this letter that some six questions had been submitted to you, requesting you to give some information about.

A. That has been sometime ago, and I would have to look it over.

937 Q. You can look it over if you like, merely to refresh your recollection.

Q. You have examined that letter, have you?

A. Yes, sir.

By Mr. JACKSON. Now that Colonel Trippe has examined Defendant's Exhibit 510 for identification, I produce what purports to be a copy of a letter addressed to Major Trippe, dated February 4, 1927, with the initials "F. W. S." and will ask to have it marked Defendant's Exhibit 511, for identification.

(Said letter is marked Defendant's Exhibit 511 for identification.)

A. I see nothing specially wrong in that letter.

(Witness referring to Exhibit Defendant's 510, for identification.)

By Mr. THOMPSON. Isn't it rather unusual to have the witness testifying about the contents of a letter before it has been introduced in evidence.

By the COURT. He has not asked the witness anything yet about the contents of the letter.

By Mr. THOMPSON. Will you read the answer that the witness made.

"I see nothing specially wrong in that letter."

By the COURT. That was a statement by the witness. He volunteered that statement.

By Mr. JACKSON:

Q. I have here, Colonel Trippe, a copy of a letter marked Defendant's Exhibit 511, for identification, which appears to be a copy of a letter, to which your letter marked Exhibit 510 for identification is a reply. I produce it merely that you may exam-

ine it, if you will, in order that you may be fully informed about your letter, Defendant's Exhibit 510, for identification.

By Mr. THOMPSON. Who was that letter signed by?

938 By Mr. JACKSON. F. W. Scheidenhelm.

You can wait until I ask the question, and then the letter would be available for Mr. Thompson's use, if there should be anything in it that he does not understand.

Q. Colonel Trippe, on yesterday you stated, on your direct examination, that the principal defect, from the standpoint of navigation, in the low water of September 1925, was at Dams 2, and 4, on the Kanawha River, or rather, I will read your answer to question one, in your letter marked Exhibit 510 for identification as follows:

"The main difficulty in maintaining pools during the dry season of 1925 was at Dams 3 and 4. There was some slight trouble at Dam 2, but not serious."

I will ask you whether that refreshes your recollection, and whether you would like to correct your statement on yesterday, with reference to which of the dams were the ones that caused the chief difficulty in 1925.

A. We had trouble at all four of these dams, 2, 3, 4, and 5. The opinion I expressed in that letter was correct at that time; we had trouble with them all.

Q. The opinion that you expressed in your letter, which I read to you, correctly states the facts with reference to the experience in 1925, does it?

A. It was my opinion at that time.

Q. And nothing has happened since that to change your opinion as to the condition in 1925?

A. After I answered on yesterday I studied the information I had and concluded from that study that Dams 2 and 4 were the ones we had most trouble at at that time, but we had trouble with all of them.

939 Q. I merely thought you inadvertently mentioned the wrong dams. I now direct your attention to paragraph headed "Question 3" of your letter marked Defendant's Exhibit 510, for identification, and read to you as follows:

"The principal loss or leakage is caused by the condition of the dams. All of the dams above Charleston are old and are not in good condition. Dams 2 and 3 are timber cribbed dams, and it is not possible to cut down leakage very much. The wickets in dams 3 and 4"——

Q. I understand that is a typographical error, and should be 4 and 5.

A. Yes, sir; it must be.

Q. (Continuing reading letter.) "Are in bad condition with he boxes loose and they require an especial amount of caulking uring the dry season. The principal difficulty is at Dam No. 4, hich is in poorer condition than any of the others."

I will ask you whether that correctly states the facts, so far s it goes, with reference to the condition and experience of the ow water in 1925.

A. Yes, sir.

Q. Major Trippe, in connection with Plaintiff's Exhibit No. 123, ounsel, yesterday, directed your attention to a letter appearing n the first sheet, and purporting to be signed by a Mr. W. J. napp, vice president of the Electro Metallurgical Company, ddressed to the Secretary of War, and which, as you read it, equested permission to make certain changes, or do certain work t the dam on the top of Kanawha Falls, in accordance with rawings and tracings, and——

A. (Interrupting.) Yes, sir.

Q. And counsel asked you whether or not there was any reply y the Chief to that request. I direct your attention to sheet 4, nd ask you whether or not that is the final disposition of the atter by the Chief, or the Chief's office?

A. Yes, sir.

Q. And you referred to the endorsement which reads: "In view of the explanation made to the applicant company by the office of Chief of Engineers, this office will take no urther action and will make no objection to the company's proeeding with the work as described in its application." Is that he disposition made by the Chief's office?

A. I was referring to the third indorsement of the Chief of ngineers, which says: "If the company concludes to proceed ith the work on this understanding, it is thought that no objecon should be raised by the District Engineers."

By Mr. THOMPSON. What is the number of the Exhibit?

By Mr. JACKSON. It is No. 123.

Q. This morning counsel for the Government has produced further Exhibit marked Exhibit 123-a. I direct your attenon to the second sheet, which purports to be a letter on the ationery of the Wilson Aluminum Company, dated November , 1898, addressed to the Secretary of War, and signed by meone, described as president of the Wilson Aluminum Comany, and ask you whether or not you can identify that letter being the request for the permission of February 27th, 1899, out which you testified yesterday?

A. Yes, sir; this starts out "We beg to present herewith a etition for permission to dam the Kanawha River on the crest the Great Kanawha Falls, West Virginia."

Q. Will you read the second paragraph of that letter?

A. (Reading.) "The Falls are situated 98 miles from the mouth of the River at the Ohio. Your petitioners are not aware that the stream was considered navigable above the Falls, but out of abundant caution, they ask permission to erect the above mentioned dam."

Q. Would you be good enough to read the bottom paragraph on the second sheet of that letter, beginning, "There is no——"?

941 A. (Reading.) "There is no navigation whatever over Kanawha Falls. Logs are not even rafted over. From Kanawha Falls up New River to the mouth of Greenbrier is 65 miles. Within this distance the stream falls 741 feet. It runs through what is practically a canyon or gorge with rocky and precipitous banks, the water working its way over shoals and falls and around large rock, and presenting so many difficulties to navigation that the flexibility of an eel or the agility of a salmon could not safely risk the dangers of its navigation. There is no present navigation for the dam to obstruct, and if the Government should decide to erect any further locks and dams, the dam which we will erect and the pool that would be above it would be utilized and would not be an obstruction. Therefore, we respectfully pray that we may be granted permission to erect a dam on the crest of Kanawha Falls, as shown in the accompanying plan."

Q. Do these drawings contain any provision for a lock for a dam on the top of Kanawha Falls?

A. Yes, sir.

Q. They do?

A. Yes, sir.

Q. Point it out to us.

A. (Witness indicates on paper.)

By Mr. JACKSON:

Q. You are pointing to a point on the diagram which is opposite the designation "Sluice-ways"?

A. Yes, sir.

Q. What kind of a lock is that?

A. It is a lock for sluice-ways.

Q. It is not a lock, is it?

A. No, sir; I thought you said sluice-ways; no, sir; there is no provision for a lock there. I misunderstood your question.

942 Q. Among the diagrams which the Government has added to this exhibit this morning, under the designation of Exhibit 123-a, is a letter purporting to be signed by Major Bixby of the Corps of Engineers, dated February 13th, 1899, and addressed to Brigadier-General John M. Wilson, Chief of Engineers, U. S. Army, Washington, D. C., and I direct your attention

to this statement, on page 2 of the letter: "The only possible interference with navigation would be to the floating of saw logs from Gauley River. As stated by the last annual report of the Gauley, there is at present no lumbering out of Gauley by river. There is a large quantity of lumber on the Gauley and though, owing to the rough character of the stream, there is little probability of much, if any, of it being sent out by river, some business of this kind may be developed in the future"; and I ask you if I have correctly read that report of Major Bixby of the Corps of Engineers?

A. Yes, sir.

Q. Was General Bixby subsequently the Chief of Engineers?

A. I am not able to answer that.

Q. In your testimony on yesterday, you stated, I believe, that you found it necessary, or expedient, to direct your assistant to communicate with the operators of the plant of the Electro-Metallurgical Company at Kanawha Falls, because that plant was fluctuating the water in such a way as to cause serious trouble in maintaining the pools?

A. Serious interference with navigation, I should have said.

Q. That had to do with the question of maintaining the pools, didn't it?

A. Yes, sir.

Q. How far was the Kanawha Falls power plant above the head of the up-stream navigation pool on the Kanawha, in 1925?

A. The whole river, you mean, above the six-foot stage?

943 Q. Above the six-foot stage of the upper pool of the Kanawha?

A. My recollection is, it is approximately 5 miles.

Q. About five miles, approximately. Now, under these existing projects, is it true that the head of navigation here is at mile 90.5 from the mouth of Kanawha River?

A. The head of the six-foot project is there, I think; yes, sir.

Q. Not the six-foot project, but the existing project?

A. I am not familiar with the new project. It is a nine-foot stage.

Q. I believe that appears from Government Exhibit 119 or 120. Am I right in understanding that the head of the old six-foot project was mile 89?

A. I would have to check that on the map. You asked if it was 90.5.

Q. I asked you about that—that is, the present project, and you said you did not know about that. I want to know if the old six-foot project that existed while you were District Engineer at Hungtington, was not at mile 90.3 rather than 89?

A. I would want to look at a map. I cannot remember exactly.

Q. Major Trippe, I want to direct your attention to paragraph headed Question 4, in your letter of February 5th, 1927, marked "Defendant's Exhibit 510," for identification, which I will read: "Question 4. The Assistant in charge of the Kanawha River states that, in his opinion, very little of the difficulty was caused by the holding back of flow at the Kanawha Falls plant of the Electro-Metallurgical Company. He states that this plant does cause a variation of a few tenths at times, but that this has not interfered seriously with navigation." And I ask you if you made that statement in your letter of February 5th, 1927?

A. You correctly read it; yes, sir.

944 Q. You tried in that letter to state the facts, to the best of your knowledge and belief, did you?

A. Yes, sir.

Q. You perhaps recall that you yourself made inquiries of your assistant at that time?

A. I don't remember.

Q. I mean before you wrote this letter?

A. Undoubtedly, I did. It undoubtedly expresses what he told me.

Q. Now, Major Trippe, you were asked a great many questions yesterday about Plaintiff's Exhibit 101, which purported to be a stenographic report of a hearing, which you held at Radford, on or about December 28th, 1926?

A. It was October 28th, 1926.

Q. Yes, sir; October 28th, 1926. And I think you testified that that was a hearing upon an application for license, and not upon a declaration of intention. Is that right?

A. That is correct; yes, sir.

Q. I direct your attention to this statement. It is difficult to follow it in this exhibit [indicating exhibit], the pages are not numbered in any fashion. What I have here is, if I am counting correctly, it is sheet 21, of Complainant's Exhibit 101.

By Mr. THOMPSON. What is it at the bottom of the page?

By Mr. JACKSON. It follows a letter signed by Ben J. Smith, Attorney. I will read as follows: "Major H. M. Trippe: I will now ask Judge Scott to present anything that he desires for the Appalachian Electric Power Company.

"Mr. Scott, Sometime ago the Appalachian Electric Power Company filed a Declaration of Intention under the last paragraph of Section 23 of the Water Power Act, which provides——"

By Mr. JACKSON. I will omit Judge Scott's quotation of the Act there, but Mr. Scott continues as follows: "I understand that the Commission has not yet passed upon that proposition. This proposition is made subsequent to that Declaration of Intention, and subsequent to future action of the Commission, and in the event

the Commission decides to take jurisdiction, then this application is to be considered."

By Mr. JACKSON:

Q. Major Trippe, should not the statement contained in that last phrase "this proposition is made subsequent to that Declaration of Intention," should not that be, "subject," instead of "subsequent;" and it also says "subsequent to future action of the Commission." Shouldn't that be "subject" to the future action of the Commission?

A. I cannot remember. I think subsequent is correct.

Q. You do not think "subsequent" is correct, do you?

A. It would not be very good English.

945 Q. It would be worse than that. It would be contrary to all possibilities or probabilities. I will continue reading (reading): "This proposition is made subsequent to that Declaration of Intention and subsquent to future action of the Commission, and, in the event the Commission decides to take jurisdiction, then this application is to be considered." Am I right in understanding from that, that Judge Scott explained at this hearing that the Appalachian Electric Power Company had filed a Declaration of Intention, and there had been no determination on that as to whether the Commission would assert jurisdiction and this application was being made concurrently subject to whatever action was taken in connection with the Declaration of Intention?

By Mr. THOMPSON. We have an Exhibit here asking that it be considered concurrently, before that, several weeks prior to the above hearing.

By Mr. JACKSON. The only point is that this hearing was on an application for a license, and it was understood at this hearing that a Declaration of Intention was being filed, and whether or not anything was to be finally done with the application, would depend on the outcome of the proceeding on the Declaration. Did you so understand that?

By the WITNESS. I would have to study that over, to answer that question. I don't know about that.

By Mr. JACKSON:

Q. Major Trippe, do you claim that this stenographic report of the hearing you held at Radford, Plaintiff's Exhibit 101, is incorrect in any particular?

By Mr. JACKSON:

Q. Major Trippe, do you have any independent recollection of anything that occurred at the hearing that is not included in Plaintiff's Exhibit 101—the stenographic report of the hearing?

A. No, sir.

Q. So far as you know, that is complete and accurate?

A. So far as I know, it is.

946 By Mr. JACKSON:

Q. I direct your attention to Exhibit 98, which is a communication bearing date—it appears to be a letter dated April 12, 1927, a report signed by Brigadier-General Deakyne, as Acting Chief of Engineers, and following that is your report dated December 22, 1926, upon the application for license, isn't it?

A. Yes, sir.

Q. And that has attached to it an index of a first endorsement by Colonel Kutz, dated January 13th, 1927?

A. Yes, sir.

947 Q. I show you this Exhibit No. 508, so marked for the defense for identification, and ask you whether or not that first communication, signed by Acting Chief of Engineers is not the fourth endorsement on the same series of reports, dated February 7, 1927, and whether or not the fifth endorsement is not a further report by you on the same series and the sixth endorsement a further report by Colonel Kutz, your Division Engineer?

A. It appears to be; yes, sir.

Q. These defendant's exhibits, marked 508 for identification, consist of four endorsements, which are in the original condition of these reports, attached to your report with Colonel Kutz's first endorsement, which now appears in Plaintiff's Exhibit 98. Is that a fact?

A. This letter of April 12th, which is apparently an original letter—the fourth endorsement is dated previous to that.

Q. It would necessarily be previous to that, of course. In any series of reports leading up to a final report or final action by the Chief, all of them would take date prior to the final report of the Chief, wouldn't they?

A. The second endorsement—do you want that?

Q. No; all we have is—we don't have the second and third endorsements, but we do have, beginning with the fourth endorsement, February 7th, 1927.

A. There is something missing there.

By Mr. JACKSON:

Q. Major Trippe, when the Chief of Engineers directs that an investigation be made and it is sent to the District Engineer, doesn't it ordinarily run through the Division Engineer for his endorsement and comment?

A. Yes, sir.

Q. And then it goes back to the Chief of Engineers?

A. Yes, sir; it goes back to the Chief of Engineers.

948 Q. And then the Chief of Engineers may send it back to the Division Engineer for some other questions?

A. Yes, sir.

Q. And he would then make a further investigation, or rather endorsement, upon the accumulated series of papers?

A. Yes, sir.

Q. And then the Division Engineer would make another endorsement to you, if you happened to be the District Engineer?

A. Yes, sir.

Q. And then you might make a further report and send it to the Division Engineer?

A. Yes, sir.

Q. And then he would make another endorsement?

A. Yes, sir.

Q. And then it would go back again to the Chief?

A. Yes, sir.

Q. And that, under the practice of the War Department, would be the complete investigation of that particular project or on the question at that particular time?

A. Yes, sir.

Q. It would all be part of the investigation?

A. Yes, sir.

Q. And the Chief, under the assumed condition of sending it back, would not make a final report for the War Department until all the papers had been returned to him for his final consideration, with such further information as he requested?

A. Yes, sir.

By the COURT. What does the witness say?

By the WITNESS. I don't know, sir.

By the COURT. What are the papers handed to you?

By the WITNESS. Endorsement 4 is an endorsement purported to be signed by Brigadier General Herbert Deakyne.

By the COURT: What does the endorsement show?

949 A. The fourth endorsement is to the District Engineers at Huntington, requesting information as follows: "1. With reference to paragraph 26, special condition No. 4, recommended to be included in the license, information is requested as follows:

(a) Minimum continuous flow required at lock No. 2 and at applicant's dam to provide navigation in the Kanawha River with the dams in their present condition.

(b) Same if the dams are reconstructed by the United States and the applicant to provide for power development as well as navigation on the Kanawha River. The applicant estimates that at the proposed dam a continuous discharge of 400 acre feet per day, or an irregular flow amounting to 4,200 acre feet per week, will be ample under these conditions.

(c) Any information that has been obtained to date regarding the fluctuation of flow in the New River due to the operation of the applicant's existing dam."

By the COURT. I didn't want the subject matter of the report. I just wanted to know if the endorsement was a formal endorsement passing it along, or whether or not it contained other data, and what effect the endorsement was. You want to know if these endorsements, or the matter brought out by the endorsements was developed with the other reports?

By Mr. JACKSON. Yes, sir. The infirmity of Mr. Thompson's statement is that he is offering a final report of the Chief and the report of the District Engineer on the preliminary investigation and information of his Superior Officer, the Division Engineer. He says that it is complete. It may be that the Chief Engineer and the District Engineer made a further report, and the Division Engineer made endorsements. I don't mean by endorsements—I am not being technical about it—I do not mean mere forwarding endorsements, but he makes comments in the matter, and these come back with other things to the Chief before he made his report, April 12th, 1927, which the Government offers, and I was trying to tie this into the report.

By the WITNESS. Apparently the fourth endorsement to me at Huntington, West Virginia, came to me and I made report on it by the fifth endorsement, February 23rd, 1927, and sent it to the Chief, through the Division Engineer.

By Mr. JACKSON:

Q. And he made endorsement with comments?

A. He made an endorsement——

By the COURT (interrupting):

Q. Do you recall that the matter came back to you for further data?

A. Yes, sir.

Q. Does this seem to be the endorsements to which it was done?

950 A. Yes, sir.

By Mr. THOMPSON:

Q. Do I understand that these papers have to do with the investigation for the application for license upon which you were asked to report?

A. Yes, sir; they were passed on to me in a report, which went to the Division Engineer and then to the Chief, and then apparently there are one or two endorsements left out, and it came back with the fourth endorsement and I answered that with the fifth and the Division Engineer with the sixth to the Chief.

By Mr. JACKSON:

Q. In connection with your testimony as to the observation of certain waves on New River—you said that these waves were nothing like those which would, or could, occur at the Radford project. I suppose you meant to say that they were nothing like those which you think could be produced by some method of operation of the Radford project?

A. The statements made at the public hearings by representatives of the Appalachian Electric Power Company led me to believe that that plant would be operated as a peak carrier, with an installation which will permit a discharge to somewhere probably 9,000 second-feet, and the wave would certainly be much larger than the ones we have.

Q. You said the waves you observed were smaller than those that could be produced by certain methods of operation at the Radford plant?

A. Yes, sir.

Q. And you don't mean to testify that the waves which would necessarily be produced by any operation of the Radford plant would be of the order of such waves that you observed—would be nothing like that?

A. I mean exactly that; yes, sir. The project that they submitted to me had the explanation which would require the use of somewhere between eight and nine thousand cubic feet per second to operate and naturally they would not install that, if they were not to use it.

951 Q. Why would it require that much to operate it?

A. Why would it require that much to operate it?

Q. Yes?

A. Because you cannot develop full power of the plant without using that much water.

Q. Do you have to use all the capacity of a hydro plant at all times?

A. No, sir; that is the point exactly.

Q. Of course, you don't personally know how the defendant is going to operate this plant, do you? They have never told you.

A. They made the statement at the hearing that I held that I spoke of yesterday.

Q. What hearing, and who made the statement?

A. I would like to have those papers. It was at the public hearing held by me [papers are handed to witness].

Q. Is it in evidence?

A. No, sir. You asked me a question and I am trying to answer it. At a public hearing held [witness refers to papers] in Roanoke, Virginia, January 13th, 1925, in the matter of the application of the Central Power Company for a preliminary permit under

the Federal Power Act, to construct dams and power dams across New River and Reddies River in northwestern North Carolina and southwestern Virginia, as described in the application before H. M. Trippe, Major Corps of Engineers, U. S. Army, District Engineers. I held the hearing at that time.

By Mr. THOMPSON:

Q. Where?

A. At Roanoke, Virginia. Mr. Buck of the Applachian Electric Power Company was present at the hearing.

Q. Who was he?

A. Mr. Buck was engineer for the Appalachian Electric Power Company. In aswer to Mr. Thorp, who was interrogating Mr. Buck, we have the following: "By Mr. Thorp: I did not intend that to be a question. I will ask you—you now are starting up
952 and shutting down the boilers and engines at different times, depending upon the river flow; the river comes up and you take more load on your Hydro plant—if enabled to set a base load on your steam plant, which you would not have to vary, then you could more economically generate than you could by switching from high to low." To which Mr. Buck gave reply: "Yes, although at present our operating height is very high, eighty per-cent; we do that by carrying our peaks on water power." That was the testimony by Mr. Buck.

By Mr. JACKSON:

Q. They were not carrying that peak on the Radford project then?

A. No, sir.

Q. You don't mean to testify that the Radford project cannot be operated without producing waves of a magnitude such that those you have observed would have no relation to them. You don't deny the physical possibility of operating the Radford project so as to say that the waves will not be of a magnitude having no relation to those which you observed?

A. Not at all; no, sir.

Q. You spoke about those observations or experiments which were being made with reference to waves of existing power plants in New River, while you were District Engineer at Huntington. Had those observations or experiments been completed, when you left the Huntington District?

A. That series; yes, sir. I would not attempt to take them in the winter. We took them up as late as we could in the fall.

Q. You stated, in response to a hypothetical question, that if the flow of New River were entirely cut off at Radford it would impair navigation conditions on the Kanawha River?

A. Yes, sir.

953 Q. How long did you assume that the flow at Radford would be cut off?

A. I did not make any assumption.

Q. Suppose it were cut off for fifteen minutes, what would the result be?

A. Very small.

Q. You would not have any, would you?

A. It would not be noticeable; no, sir.

Q. When you made this answer, you did not have in mind any period of time that you assumed the flow at Radford would be totally cut off, did you?

A. I assumed it would be for an appreciable time; yes, sir.

Q. You assumed, didn't you, that it would be long enough, so that under low-water conditions, there would not be water enough in the Kanawha River to maintain the pools?

A. Even though it might interfere with navigation, if it did maintain the small pools.

Q. Can you give me any better statement of how long you considered the water being cut off at Radford, when you answered the question?

A. I considered an appreciable length of time.

Q. What would you regard as an appreciable length of time?

A. I don't believe I would care to make a statement. One minute would make a very slight effect, and one hour a larger effect.

Q. Is it your testimony that, if it was cut off one minute, it would have any effect on navigation at Kanawha River?

A. Not any appreciable effect; no, sir.

Q. Would it produce any effect that you could notice on the Kanawha?

A. No, sir.

Q. Would one hour produce any effect that you could notice?

954 A. It might be made by a recording gauge—it might not; it depends on the flow of the river at the time.

Q. You cannot say whether or not the difference could be detected by the recording gauge, could you?

A. You ask so many things. You did not give me the flow of the river.

Q. I am giving you everything you had when you answered the question.

A. The flow would be absolutely cut off.

Q. You made no limitations before, as I understand it?

A. I thought that was implied in the question—that the flow was to be absolutely cut off.

Q. That the flow was to be cut off absolutely for one hour?

A. I don't know that there was any definite time.

Q. The question that I ask you now has in it more information that you had when you answered the question before.

A. It will have an effect; yes, sir.

Q. And you think you will be able to measure that on the Kanawha River?

A. I am not sure I could. I answered that I conducted experiments with waves; so I take it, it would have—it would have some effect.

Q. And you did not arrive at any satisfactory conclusion?

A. No definite conclusion, except they did persist—the waves.

Q. What physical conditions on the Kanawha River did you assume, in answering that?

A. What do you mean?

Q. What kind of navigation channel—what navigation did you consider to be existing on the Kanawha River when you answered the question on direct examination?

A. I assumed commercial navigation.

955 Q. Did you assume slack water navigation?

A. Yes, sir.

Q. And what kind of dams did you assume to be in place?

A. The kind that are there at present.

Q. And that includes the two dams—London and Marmet?

A. Yes, sir.

Q. And it includes six old dams being replaced?

A. Yes, sir.

Q. And it was on the basis of that assumption that you answered the question?

A. Yes, sir.

Q. That is all.

Q. Colonel Trippe, at page 1924 and 1925 of the record you were asked "Have you ever been up New River?" and you answered "Yes, sir," and then proceeded to say "On two trips up to the mouth of the Wilson." I want to ask whether you made those trips up New River by boat?

A. No, sir.

Redirect examination by Mr. THOMPSON:

Q. Colonel Trippe, have you ever been to the site of the Radford dam?

A. Yes, sir.

Q. How many times?

A. At leas three times.

(Exhibit 130, being letter dated July 1, 1927, from O. C. Merrill, Executive Secretary of the Federal Power Commission, to Curtis, Mallet-Prevost, Colt & Mosle, together with form of major license tendered Appalachian Electric Power Co., and exhibit 131, being

letter dated May 5, 1931, from George Otis Smith to Appalachian Electric Power Co., % Curtis, Mallet-Prevost, Colt & Mosle, together with form of major license tendered defendant at that time, were offered in evidence.)

956 EDWIN W. KRAMER

Direct examination by Mr. MCCLERNAN:

Q. What is your name?

A. Edwin W. Kramer.

Q. And what is your residence and occupation?

A. My residence is San Francisco. I am a Civil Engineer.

Q. What schooling did you have as an engineer, Mr. Kramer?

A. I went to Cornell University from 1902 to 1905 and received the degree of Civil Engineer.

Q. What was your engineering experience prior to the time you became employed by the Government?

A. Immediately after leaving Cornell I was employed on the New York State Barge Canal for six months. From that time I went to the employ of the Army at New London, Connecticut. I was there for two years building small steam plants and water plants and things of that nature. After that I entered the employ, in 1907, of the United States Forest Service.

Q. What experience in engineering have you had in the Forest Service?

A. I was with the United States Forest Service from 1908 until June 30th, 1936. In 1908 I reported on the safety of the Lake Como Dam of Bitter Root Valley Irrigation Company in Montana. I reported on the application of the Skagit River Power Company in Washington for a hydro project, capacity 300,000 horsepower. In 1909, I established a number of stream gauging stations in Montana and northern Idaho and made stream measurements in cooperation with the United States Geological Survey.

In 1913 I reported on the application of the Montana Power Company for the Hebgen Reservoir at the head of the Madison River in Montana and a system of power plants on the Madison and Missouri Rivers with a total capacity of over 200,000 horsepower.

957 In 1915 I reported on application for power projects in Montana, Idaho and Washington, including Canyon Project on Clarke Fork, Columbia River, 118,000 horsepower, and Thompson Falls Project of Montana Power Company on the same stream in Montana, 40,000 horsepower.

In 1918 I prepared a description and estimate of all the water-power in Montana which was published in the Electrical World.

In 1919 I reported on the application of the City of Seattle for a complete development of the Skagit River in Washington, something in the neighborhood of 300,000 horsepower.

In 1920 I was in California reporting on applications to the Federal Power Commission. I was employed by the Forest Service but the Forest Service was the field representative of the Federal Power Commission.

In 1921 I reported on the project of Nevada irrigation district on the Yuba River in California at a cost of $2,800,000.

In 1923 I reported on the application of Merced Irrigation District, a project of five and one-half million dollars.

In 1924 and 1925 I reported on application of the southern California Edison Company, Pacific Gas & Electric Company, and Southern Sierras Power Company in California, a total of over 500,000 horsepower. In every case it was necessary to make a complete study of the water resources involved, the power market and the economics of the situation.

In 1928 I represented the Federal Power Commission on the Federal State Board, appointed by President Hoover and Governor Young of California, to study the Central Valley Project, estimated at $165,000,000. Prior to the failure of the San Francisco dam in California in 1928, the Federal Government was almost the only authority passing on the safety of dams to be constructed or under construction on Government land. I had to analyze the stresses and inspect the construction of a
958 number of the largest dams in the world, including the Exchequer dam on the Merced River, 320 feet high, the Salt Springs dam on the Moklumne River, 332 feet high, the Pocoima and San Gabriel No. 1 Dam of the Los Angeles County Flood Control District, 372 and 381 feet high, respectively. I also passed on the plans of the Canyon Diablo Dam in the City of Seattle, which I believe is the highest dam in the world, depending entirely on arch action for its stability. In many cases it was found necessary to require changes in plans.

I was regional Engineer for the Forest Service in San Francisco for the California Region of the Forest Service until June 30th, 1936. Since that I am now Regional Director for the Western Region of the Federal Power Commission, including the Pacific Coast States and the adjoining states on the East.

Q. Where were you located in 1925, Mr. Kramer?

A. San Francisco.

Q. Will you tell us briefly what hydroelectric plants are and how they operate?

A. Hydroelectric plants are plants constructed on streams to convert the energy in the water into mechanical energy through their penstocks and turbines and then into electrical energy by

means of their generators. They may be constructed with a capacity equal to the dependable flow of the stream or they may be constructed to a greater capacity, for instance, the capacity necessary to use the average flow of the stream, or they may be constructed to a capacity to use a considerably larger flow. In the first case, where they would be constructed to use only the dependable flow, they may have small reservoirs which are capable of varying the flow throughout the day. Those reservoirs are ordinarily spoken of as ponds. These ponds may have sufficient capacity to vary the flow sufficiently to allow the plant to take care of the load on the system to which they are connected equivalent to the load factor on the system. The ponds may be larger
959 so that these plants can take just the peak off of the load on the system.

Q. What do you mean by a peak load?

A. Could I finish answering your question? On the streams where the plants are constructed to use the average flow it is necessary for them to have larger reservoirs to save the water during the months of high flow for use during the months of low flow. They also may be operated to take care of the peaks on the system if the capacity of the turbines and generators is sufficient to use considerably more than the average flow.

Q. What do you mean by a peak load that you mentioned?

A. On the usual large system the lowest output of power may occur about five o'clock in the morning. At about seven o'clock the load begins to go up, due to people going to work and using more streetcars and for other reasons. At eight o'clock when more factories go on, the load goes up still further, approaching its maximum. The maximum will frequently occur about eleven o'clock. There will be some falling off between eleven and twelve, due to the noon hour, and in the afternoon there will be a second peak, probably not as high as the eleven A. M. peak or the peak occuring between eleven and twelve. The load will stay up fairly well until sometime after four o'clock, and then fall off until around six o'clock. When the lights go on in the evening there will be a third peak occurring probably at seven or seven-thirty and then the load will gradually go down. During the night it may be only three-fifths of what the peak was in the daytime.

Q. How are such loads usually carried by power plants such as we have in this part of the country? Perhaps I should say power systems instead of power plants.

Mr. JACKSON. I interpose the objection that the witness has shown no qualifications to express an opinion as to how systems in this part of the country carry a peak load. His experience has only been on the Pacific Coast.

The COURT. He may answer it.

Mr. JACKSON. I note an exception.

A. In this part of the country most of the large power systems have both steam and hydro plants. The hydro plants usually are less than half the capacity of the total installation on the system.

In times of high flow when there is lots of water available,
960 it is most economical to get as much power as you can out of the hydro plants and carry the varying load on the steam plants. In times of low flow, in order to have sufficient capacity to carry their peaks, it is most economical to run the hydro plants on the varying load if there is sufficient installation and water available to carry the peak and to run the steam plants on the uniform base load as near as they can do it.

Q. Does the operation of a hydroelectric plant, in the manner you have described, to carry peak loads have any effect on the flow of the stream below the plant?

A. It causes the flow to vary throughout the day and also throughout the week if the plant is shut down on Saturdays and Sundays.

Q. Does that effect continue downstream?

A. It does on certain streams.

Q. We shall have occasion to talk about these effects, I think, Mr. Kramer, in rather technical language. Will you tell us what is meant by the crest of the wave and trough of the wave caused by the hydro plant operation?

A. As water is released from a hydroelectric plant in varying degrees—I can best describe that by selecting some point below the plant. For instance, we will say, ten miles below the plant. As the water passes that point it will rise and fall throughout the day. At some time in the day the water will be highest. At some time in the day it will be lowest. The rise and fall can be measured by a gauge. The gauge will give the rise and fall in feet. The highest reading on the gauge could be called the crest of the wave and the lowest reading on the gauge could be called the trough of the wave. The difference between the two could be called the amplitude of the wave expressed in feet. However, in studying waves better conclusions can be drawn in regard to them if these gauge heights are converted into stream flows, in which case the stream flow equivalent to the highest gauge reading would be the crest flow or the crest of the wave and, likewise, the stream flow corresponding to the lowest reading would be the trough of the wave. The amplitude then would be the difference between
961 the two stream flows and would be expressed in cubic feet per second and the flow in cubic feet per second. There is also another fact to consider and that is the average flow that occurs throughout the wave cycle. The amplitude of the crest

of the wave, expressed in second feet or cubic feet per second, would be the difference between the average flow and the maximum flow. The amplitude of the trough would be the difference between the minimum flow and the average flow.

Q. What is meant by the period of a wave, Mr. Kramer, and the period of the crest and the period of the trough?

A. The period of the wave would be the time that the complete cycle of the wave occupied in passing a given point. Ordinarily in the waves that we are talking about it would be 24 hours or some time nearly 24 hours. The period of the crest would be the length of time that the flow is above the average flow. The period of the trough would be the length of time that the flow was below the average flow.

Q. Do you have any diagram or chart that would illustrate the explanation you have made?

A. I have.

(This chart was marked "Government Exhibit No. 132 for identification.")

Q. Mr. Kramer, I call your attention to the chart which is marked plate [illegible] diagram showing change in wave as it travels downstream, and which the reporter has marked for identification Government Exhibit No. 132. Is that the chart or diagram that you mentioned?

A. It is.

Q. What is the significance, Mr. Kramer, of the vertical lines that I see going all the way across the exhibit?

A. The vertical line is one hour.

Q. That is, the spaces between each pair of lines represent the lapse of time of an hour?

A. One hour.

Q. I notice a number of areas covered in blue and green on the exhibit. What do they indicate?

962 A. May I explain the exhibit just a little?

Mr. JACKSON. May I ask is this an exhibit to be offered in evidence or is it one that has been produced merely for illustrative purposes?

Mr. MCCLERNAN. It is merely illustrative. We propose to have the testimony constitute the proof.

Mr. JACKSON. The point I am getting at, this exhibit is not intended to exhibit any condition upon any stream?

Mr. MCCLERNAN. No; it is purely diagrammatic.

Mr. JACKSON. It is purely a hypothetical chart?

Mr. MCCLERNAN. I don't think I would call it that but it is a diagrammatic representation of the phenomena.

Mr. JACKSON. The point is if it is supposed to illustrate the condition on any stream anywhere, I should like to know that.

Mr. McCLERNAN. No; it doesn't illustrate any actual wave at any place.

Mr. JACKSON. It doesn't represent any actual wave anywhere whatever?

Mr. McCLERNAN. No.

The period between each two vertical lines represents one hour. The stream flows are represented by the height of these lines. For instance, the line at the top of the first square represents a stream flow of 9,000 cubic feet per second. The lower two squares are intended to represent a wave as it is released from a power plant. It is assumed that the flow will be increased from zero, which is represented by the bottom line of the entire diagram, to 9,000 second-feet which is represented by the top line of the first blue square to the left and also by the 9,000 second-feet on the second square which is at the same distance from the bottom of the diagram. Under the assumptions that this was drawn, the flow was allowed to continue at the rate of 9,000 cubic feet per second for six and one-third hours. The water was then completely shut off and kept shut off for seventeen and two-thirds hours and then increased again to 9,000 second-feet which was continued for six and one-third hours. I have one more thing here. The average flow was assumed to be 2,000 cubic feet of water per second which is represented by the second line from the bottom on which is written "Average flow 2,000 c. f. s." The amplitude of this wave would be 9,000 cubic feet per second which is the difference between zero and 9,000 cubic feet. The amplitude of the crest would be 7,000 cubic feet per second which is the difference between the average flow of 2,000 cubic feet and the maximum flow of 9,000 cubic feet. The amplitude of the trough would be the difference between zero and 2,000 cubic feet per second or 2,000 cubic feet per second. The period of the crest would be six and one-third hours, the period of the trough would be seventeen and two-thirds hours and the period of the wave twenty-four hours. Shall I go ahead with the explanation or do you want to ask me another question?

By Mr. McCLERNAN:

963 Q. Mr. Kramer, you have been talking about the two blue squares in the lowermost position of the chart. Will you pass now to the colored areas next above them and explain what they mean?

A. The second diagram from the bottom of the chart shows a heavy black line at the lower portion. This represents the water that has run into the stream below the point where the waves were generated. It is assumed here that this point downstream at a time ten hours later 1,000 cubic feet of water per second has

flowed into the stream. The diagram is assuming the change in the wave that has occurred in that distance. I may say, in general, this is the way that waves below power plants behave, in different degrees, of course, due to the different characteristics of the stream, and the distance the water will flow in the time I have assumed, the difference in amplitude and difference in period.

The diagram, I think, in a general way shows how the waves behave as they continue downstream. At this point, ten hours below, the amplitude, at both the crest and the trough has remained the same.

May I say something else here that might be of interest? The waves we are studying here travel in the neighborhood of from three, to five, or six, or eight miles per hour, so that if this represented twenty-four hours [indicating]——[interrupted].

By Mr. JACKSON. I understand this is merely a technical description of wave action, and it isn't any particular wave we are studying. The witness may say for the purpose of this chart the explanation has assumed a hypothesis, but I don't want this to develop into any particular wave or any particular river.

By the COURT. I don't think he has done that yet.

A. (Continuing.) May I modify that and say that waves below power plant have speeds of this order. If we assume this wave just to get some idea of how fast it travels, travels at the rate of three miles per hour, in twenty-four hours it would have traveled seventy-two miles, and the length of the wave from trough to trough, or crest to crest, would be seventy-two miles. If you were standing on the banks of the stream, as on many streams, the rise and fall of the wave would be very gradual, probably imperceptible. It could, however, be measured by a staff gage or automatic gage. The rise and fall, however, would be a matter of feet, whereas the length of the wave is a matter of miles.

964 The green diagram or the green area in the second diagram from the bottom preceding the wave, the waves are traveling from right to left. The green area represents water that has preceded the crest of the wave slightly, and is beginning to get into the trough, also the green area following the square is lagging behind the crest and is beginning to fall back into the trough.

The amplitude, this far downstream—this ten hours below—is as much as it was when the wave started, the amplitude of the trough being 2,000 second-feet and the amplitude of the crest being ,000 second-feet.

The third diagram from the bottom represents the same wave at a time fourteen hours later than the second one, or twenty-four hours later than the first one.

It is assumed here that the stream flow that has run into the stream below the point where the waves were generated has increased to 4,000 cubic feet per second. This is shown by the heavy black line at the bottom of the third figure from the bottom.

The amplitude of the entire wave at this point has been assumed to have decreased to 4,500 cubic feet per second, the amplitude of the crest having decreased to 2,500 cubic feet per second. The amplitude of the trough, however, having remained the same.

On this assumption that is attributed to the fact that the period of the trough from start, or to start out with, was 17⅔ hours, whereas the period of the crest was only 6⅔ hours indicating the shutting off the water for a long time has caused the amplitude of the trough to persist at 100% whereas the short time the large flow was turned on has caused the crest to diminish from 7,000 cubic feet per second to 2,500 cubic feet per second.

The fourth diagram from the bottom is sixteen hours later than the third one, or about forty hours later than the time the waves were generated. It is assumed here that the wave has begun to flatten out for the purpose of illustrating how waves flatten 965 out. I might say the area in red on each one of the diagrams represents water that has—not water—but the change in the area of the wave, the red area having left its position in the traveling form of the wave and gone to the area shown in green. That is true of each one of the diagrams.

It is assumed in the top diagram that the stream flow tributary below the wave has increased to 6,000 cubic feet per second. The amplitude of the wave is 3,500 second-feet under this assumption. The amplitude of the crest has decreased to 1,500 second-feet. The amplitude of the trough has decreased from 2,000 second-feet to 1,500. The amplitude of the crest and trough are now the same, however, the amplitude of the crest is one-sixth of what it was to start with. The amplitude of the trough is three fourths of what it was to start with, or 75%, that is due to the fact under the assumptions I have here and which I believe is largely true of all power waves on all streams, the longer the period of either the crest or trough the farther the wave will persist down stream, and the greater the degree will be of the persistence.

Q. Mr. Kramer, in your opinion is this Exhibit #132 a correct diagram'ic representation of the way the waves we have been discussing behave as they travel downstream?

A. It is the general way. It was necessary to make assumptions which might be different on different streams, but I think that in a general way the waves will follow the method I have shown on the diagram.

(Exhibit 132 offered in evidence.)

Q. What are the factors in the generation of waves of this sort that affect their persistence downstream?

A. I think the most important factor is the period of the trough and period of the crest, the longer the period the further the wave will persist downstream; this is ordinarily understood that the longer you shut the water off the farther downstream the effect will be noted, and the greater the degree and the longer you turn the larger flow on and keep it turned on, the farther its effect will be noted, and the greater the degree.

966 Q. Now, is the amplitude of the wave as important as the period?

A. I don't regard the amplitude as important as the period. It is, however, an important factor in the persistence of waves. The greater the amplitude of the trough or crest the greater the persistence of the trough and crest would be on the stream, other conditions being constant.

Q. What do you call the process of smoothing out of these waves as they go downstream?

A. I usually refer to it as dampening out.

Q. Is that term in common use?

A. I think so.

Q. What are the factors that cause the wave to be dampened out?

A. I regard the most important factor as any condition along the stream that will require the water to rise and fall the most, for a given change in stream flow. I think the reason of this is that for a certain rise in the flow the water along the front of the wave, that is the surface of the water in front of the wave, will be steeper and the slope of the water back of the wave flatten than the grade of the stream; the steep front will cause the wave to travel, the crest of the wave to travel, more rapidly and the flat back slope of the wave will cause the water to travel more slowly, the water in the back of the wave lagging back to the trough.

Q. Were there any other factors you wanted to mention?

A. The factors on a stream.

Q. Any factors, to be particular, what characteristics of a stream bed affect the dampening of a wave?

A. Well a narrow type stream or a narrow stream, the water going through a narrow stream will rise or fall more for a given change in stream flow than it will on a wide, shallow stream;

967 therefore, for the same slope the wave would be more persistent on the wide, shallow stream than it would on the narrow, deeper stream for the same change in stream flow, and for the same average stream flow. The grade of the stream, I regard next in importance. It is my opinion that for grades with a fall of less than ten feet per mile the streams with slope of less

than ten feet a mile the difference is so little that factor is not as important as the width of the stream.

Other important characteristics are the slope of the banks, if they are nearly straight up and down for the height of the wave rises and falls, the banks will have little effect on the waves; in other words, the banks will not cause a dampening out of the waves; if, however, the banks are sloping for the distance that the water rises and falls, the water will spread out more over this greater area, the water being taken out of the crest to some extent and returned to the trough as the trough passes the point we are considering.

Q. Did you ever make any experiments in order to determine the persistence of power plant waves, such as these we have been discussing?

A. I have observed waves created by power plants, at my request.

Q. You mean some waves created by ordinary operation and others created intentionally?

A. Yes, sir; by unusual operation.

Q. Where did you do that?

A. The first case was on the Pit and Sacramento Rivers in California, in 1925.

Q. Any other instances?

A. Two other instances. On the Klamath River in California, 1927 and 1935. I have also studied the wave action on streams in general, but not to the extent they might be called experiments.

Q. Did you tell us where the Pit and Sacramento Rivers are?

968 A. In California.

Q. Don't the head waters lie in Oregon?

A. No; practically all the Pit and Sacramento Rivers are in California.

Q. Will you describe the method of making your observation on the Pit and Sacramento Rivers?

By Mr. JACKSON. I object to that question. We are certainly not going to try, I assume, in this case the question of the conditions of the Pit and Sacramento Rivers, and it is improper and incompetent for this witness to testify as to that.

By the COURT. Can't he describe conditions pertaining to this? [Question read.] I see no objection to describing the method.

By Mr. JACKSON. How he goes about making observations of power waves on any river? I cannot help but feel a question asking for observations on the Pit and Sacramento Rivers must be designed to bring out the nature and result of experiments on those rivers.

By the COURT. When it gets to that stage I will stop it.

By Mr. JACKSON. I thought it was at that stage. May I have my exception noted?

By the COURT. Yes, sir.

A. Pit #3 power plant of the Pacific Gas and Electric Company is located on the Pit River. I will have to get my data on that.

By Mr. JACKSON. I suggest the method is not dependent on the location.

By Mr. MCLERNAN. As I understand the witness is telling us where these various points are he made those observations.

By the COURT. He is going to describe how he goes about making these tests.

By Mr. JACKSON. I can't see it has any pertinency in this case unless and attempt to prove something observed that depended on the Pit and Sacramento Rivers.

By the COURT. It might be illuminating to me to know how he goes about making such tests. It might have a good deal of effect on the importance I would attach to it.

By Mr. JACKSON. I wonder if I have made my position clear? What I have in mind is this: It is often argued when a technical engineering question is involved before a Court, involving a particular river, or involving the valuation of a public utility, it would cast some light upon the question to find out the value of some other utility, or to find out what conditions were found to exist on some other river, but so far as I know it has been the universal determination of the Courts that that cannot be offered by an expert as part of his direct examination, and if admissible and competent for any purpose, it must be open to the adversary to explore what the conditions were on the other river or utility.

By the COURT. He was asked if he ever made experiments along the lines of the chart and diagram he exhibited, and he said yes, and now he is asked to tell how he did it.

By Mr. JACKSON. If I made myself clear I don't want to argue further about it.

A. Pit #3 power plant of the Pacific Gas and Electric Company is located on the Pit River at a point 53 miles above the junction with the Sacramento River. There is a reservoir a short distance above the power plant. We requested the power plant to vary the flow. At a point 15 miles below the power house, there is a regular gaging station of the U. S. Geological Survey which is called Big Bend; at a point 38 miles still further downstream is located the gaging station called Ydalpom; at a point 75 miles still further downstream is a gaging station called the Red Bluff gage. The total distance from the power house to the Red Bluff gage is 128 miles. The flow is observed at the power

house by reading venturi meters, and the flow was also measured in the stream opposite the power house, the water that did not go through the turbines was measured by automatic gage. The flow was measured at each of the gaging stations I mentioned, and those flows converted into stream flows all platted on the same chart.

Q. You say you charted the results of your observations?

A. Yes, sir.

Q. Did you mean the size of the waves you used for the purpose of your observations there?

By Mr. JACKSON. I would like to show the same objection to that question.

By the COURT. Objection overruled.

By Mr. JACKSON. Exception noted.

A. The average flow at the Pit 3 power house was about 2,000 second-feet during the period of the experiment. The experiment was carried on from August 7th to August 12th,
969 1925, inclusive. On some days the flow was reduced 400 second-feet and this reduced flow maintained steadily for about six hours. This was the usual procedure. For the rest of the twenty-four hours or for eighteen hours the flow that had been stored was released and was added to the natural flow of the stream, causing waves with a trough period of about six hours, and a crest period of about eighteen hours. Some days the amplitude of the wave would be 400 second-feet. One day it was 600 second-feet, and one day 700 second-feet, but the periods were the same, and the average flow of the stream was about the same; the whole week it increased slightly from 1,900 second-feet, at the beginning of the week to about 2,100 second-feet at the end of the week. That is the normal flow.

By Mr. MCCLERNAN. Now, I propose to ask the witness for the result of his experiments, and I understand we will have a discussion of the law on that.

By the COURT. Not unless you can show me where it is permissible. [Argument omitted.] I don't believe I can allow you to do that.

By Mr. MCCLERNAN. Exception.

Q. Are you familiar with the New and Kanawha Rivers here in North Carolina, Virginia, and West Virginia?

A. I am.

Q. Did you examine them personally?

A. I did.

By the COURT:

Q. Do you know the fall in the New River for seventy-two or eighty miles below Radford?

A. Yes, sir.

Q. Do you know the similar fall in the Sacramento River?

970 A. Yes, sir.

Q. Do you know the average width of the New River from Radford down to Hinton?

A. I have seen the river in a number of places and measured the width of each of the bridges, but I don't think anyone would know the average width.

Q. Do you know the narrowest width of the river between Radford and Hinton?

A. I think the Narrows would probably be.

Q. Do you know what the width is there?

A. I have a picture and estimated width, I never measured it; no, sir.

Q. Do you know the widest place on New River between those points?

A. No, sir.

Q. Do you know the same data on the Sacramento River?

A. No, sir. I have measured the width of it at a number of places, but I could not tell you the average.

Q. You are speaking of the general characteristics of the stream?

A. Yes, sir.

Q. Not with any actual similarity of measurements or topographical features of the stream?

A. I think by looking over the streams carefully and getting the average fall and steepness of the banks and flows you are studying, that study of one stream will be indicative to a large extent of what will happen in another stream. I have not studied the streams to the extent, however, you question me.

Q. I believe you said also Mr. Kramer you conducted certain observations on the Klamath River?

A. Yes, sir.

Q. What was the method of making your observations there?

By Mr. JACKSON. May we note our objection to that question, and I understand your Honor overruled it?

By the COURT. Yes, sir.

By Mr. JACKSON. And may our exception be noted?

By the COURT. Yes. It is similar to the question I allowed him to answer.

A. There is a large reservoir on the Klamath River, above what is called the Copco Power Plant. The distance from the

971 Copco Power Plant to the ocean is 202 miles. Immediately below the Copco Power Plant on the Klamath River there is an automatic gage maintained by the Geological Survey, and another one at a point called Seiad; a distance of 64 miles below. It

is a staff gage. I made two experiments on the river, the first time with a staff gage and the second time an automatic gage. At a point 69 miles below Seiad is a point called Somes Bar. In my reports to the Federal Power Commission this was called Red Rock Island gage, Somes Bar and Red Rock Island being the same. At a point 65 miles below Somes Bar is a gage called Requa gage. It is about 4 or 5 miles from Requa to the ocean. The original operation of the Copco Power plant used to carry peak loads. Water is reduced very much on Saturday and Sunday, but the wave cycles for the remaining five days of the week are fairly uniform.

Q. Where did you observe the waves?

A. We observed the waves at each of the gaging stations I have mentioned, Copco gage, Somes Bar, Seiad and Requa gages, the lower gage being 198 miles below the point where the waves were generated.

Q. What size were the waves?

A. The ordinary procedure, other than Saturday and Sunday. This is normal operation of the plant and made no unusual operation at our request. About six o'clock in the morning the stream flow was increased from 700 second-feet to 2,200 second-feet. It was then increased farther throughout the day to 3,200 second-feet. I am describing one particular wave that was created on November 4, 1935 of the Copco plant. They have varied a little bit. One time during the day the wave reached a flow of 3,200 second-feet. At about eleven o'clock at night the flow was reduced, the flow had decreased during the day up to eleven o'clock at night, it had gradually decreased to 2,400 second-feet. It was then decreased to 500 second-feet, which flow continued until six o'clock the following morning.

972 Q. Did you give us the dates you made those observations?

A. The first observation was made on the Klamath River from February 12th to February 17, 1927. The second ones were made from November 2, to November 7, 1935.

Q. Was there any difference in the method of making your observations between the ones you made in 1927 and 1935?

A. The ones we made in 1927 went down only to the Somes Bar, the gage there, a distance of only 133 miles, whereas the ones in 1935 went down to the Requa gage, a distance of 198 miles.

Q. Did you communicate to the Federal Power Commission any results of your observations made on the Pit River in 1925?

A. They were reported to the Federal Power Commission within a few days after they were made and worked up.

Q. Did you report to them your observations made in your report on the Klamath River?

A. I did.

By Mr. McCLERNAN. If your Honor please, for the purpose of the record, I now offer to prove by this witness the results of his observation made on the Klamath River, particularly with reference to the distances of the persistent down stream of the power waves observed.

By Mr. JACKSON. We object.

By the COURT. Do you want to introduce evidence contained on that diagram, or chart, showing the actual results of those experiments on those rivers?

By Mr. McCLERNAN. Yes, sir.

By the COURT. I sustain the objection.

By Mr. McCLERNAN. We desire to except.

By the COURT. Of course, you will understand, Mr. McClernan, that I am ruling out now evidence of specific experiments or happenings on these other streams. I am not undertaking to rule that this witness is not an expert on this subject, and cannot testify from his experience what can happen on those rivers. You understand that?

By Mr. McCLERNAN. I understand that.

By Mr. JACKSON. If your Honor please, Mr. McClernan wants to use certain blueprints at this stage which we have not fully checked. We have no doubt they are accurate, and we would like to stipulate we concede their authenticity subject to our right to check them and call his attention and the Court's attention to any errors, if there be any. In that way we will not delay Mr. McClernan.

By Mr. McCLERNAN. They are the same as the blueprints that were identified by Mr. Derzulaitis.

By Mr. JACKSON. They are only in part the same. They are only a part of those covered by Mr. Derzulaities' identification, but we are willing that they shall be used, subject to our finding any errors.

I am told that some of these blueprints you have produced, or at least the original tracings to be offered in evidence, have some pencil notes on them. It is understood that our stipulation does not extend to those pencil notes on them, and they are not offered for that purpose.

By Mr. McCLERNAN. That is satisfactory.

Q. Mr. Kramer, I have here Government Exhibit 133, which is a blueprint entitled "Discharge, hydrograph wave study of New River, at Allisonia, Virginia, and which is dated in the lower left-hand corner, March 1930," and appears to run from March 11, 1930, to March 31, 1930.

By Mr. McCLERNAN:

Q. Mr. Kramer, do you recognize it?

A. I do.

Q. I have here Government Exhibit marked for identification 134, which is a blueprint entitled: "Discharge, hydrograph wave study of New River at Eggleston, Virginia, March 11 to 31, 1930," which is dated in the lower left-hand corner, March 1930, and appears to run to March 31, 1930. Do you recognize that?

A. I do.

Q. I have here Government Exhibit No. 135, which is a blueprint entitled: "Discharge hydrograph wave study of New River at Glen Lyn, Virginia, March 12 to March 31, 1930." Do you recognize that?

A. I do.

973 Q. I have here Government Exhibit No. 136, which is a blue print entitled: "Discharge hydrograph wave study of New River, at Hinton, West Virginia," which is dated in the lower left-hand corner March 1930, and appears to cover from March 13, 1930, to March 31, 1930. Do you recognize that?

A. I do.

Q. I have here Government Exhibit No. 137, which is a blue print entitled: "Discharge hydrograph wave study New River at Caperton, West Virginia," which is dated in the lower left-hand corner March 1930, and appears to cover from March 12 to April 3, 1930. Do you recognize that?

A. I do.

Q. I call your attention to Government Exhibit 138, which is a blue print entitled: "Discharge hydrograph wave study New River at Damsite "A" near Radford, Virginia," which is dated in the lower left-hand corner March 1930, and appears to cover a period from March 11 to March 31. Do you recognize that?

A. I do.

Q. I call your attention to Government Exhibit 139, which is a blue print entitled: "Discharge hydrograph wave study of Kanawha River, at Kanawha Falls, West Virginia," which is dated in the lower left-hand corner March 1930, and appears to cover a period from March 12 to April 1, 1930. Do you recognize that?

A. I do.

Q. I call your attention to Government Exhibit No. 140, which is a blue print entitled: "Discharge hydrograph wave study of New River, at Ivanhoe, Virginia," which is dated in the lower left-hand corner March 1930, and appears to cover a period from March 12, 1930, to March 31, 1930, and possibly an hour into April 1, 1930. Do you recognize that?

A. I do.

974 Q. I call your attention to Government Exhibit No. 141, which is a blue print entitled "Discharge hydrograph wave study of Kanawha River, Lock No. 2, at Montgomery," which is dated in the lower left-hand corner March 1930, and appears to cover a period March 14 to March 31, and extending some distance into April 1, 1930. Do you recognize that?

A. I do.

(Exhibits 133, 134, 135, 136, 137, 138, 139, 140, and 141 offered in evidence.)

By Mr. McCLERNAN:

Q. I notice that these exhibits are entitled: "Discharge hydrographs." Is there any particular reason from an engineering standpoint why the graphs should be made in terms of discharge rather than in terms of gauge heights?

A. Those hydrographs were made up at gauging stations along New and the upper end of Kanawha River, from gauge readings and rating curves that had been made by the U. S. Geological Survey. They were made under the supervision of Mr. Derzulaitis. The reason that they show stream flow in cubic feet per second instead of showing changes in gauge height along the river, is to show changes in the wave as it goes downstream. You can observe changes in the wave as it travels downstream, much better if you study it in streamflow rather than if you study it in gauge heights for the reason that when water passes a narrow section the water will rise and fall more for a certain change in flow than it will rise and fall when it passes a wide section. When you are attempting to study a wave by changes in gauge heights you may get a larger change in gauge reading in any stream, way downstream than you would at some intervening point along the stream, whereas the change in stream flow, or in other words, the amplitude of the wave expressed in stream flow usually is fairly continuous without any abrupt change. That is rather hard to understand.

Q. As a practical matter, what is the process of converting gauge height reading into stream-flow figure that the U. S. Geological Survey uses or rather when the U. S. Geological Survey establishes a gauging station on a stream?

975 A. The first step is to establish a gauge to record the height of water as it passes the station. They will then make discharge measurement with current meters at the same place by actually measuring the velocity of the water across the stream at a number of points and the depth of the water at the same time by measuring the depth and the velocity at each point they can compute the stream flow. They do that for various elevations of water on the gauge. When they have finished this they plat these points on a sheet of paper and draw a smooth curve as near as they

can through the points. Then by referring to the coordinates on the side of the paper for certain gauge readings they can tell with reasonable certainty there was a certain stream flow.

Q. You said you recognized all of these exhibits. Have you made use of them for any purposes?

A. I have used them first to compare them with computations I have made or with similar charts I have made myself at most of these points, not all of them, but I have made similar charts at Ivanhoe, Radford, Eggleston, Caperton, and Kanawha Falls, but not for as long a period. I picked out five or six days instead of continuing the chart for a whole month. The charts that I computed are almost identical with these. There was not enough difference, I don't believe, to be of any importance.

Q. From your study of these Exhibits, 133 to 141 inclusive, you were able to come to any conclusion concerning the wave effect which the exhibits show, if any, and the manner and distance which they traveled downstream?

A. May I describe the waters. Do you want me to answer the question that way?

Q. Answer it any way you think is correct.

A. These lines that go up and down on the exhibit show the flow in cubic feet, per second, at the various points.

By Mr. JACKSON:

Q. Would you mind indicating the number of the exhibit you are pointing to, Mr. Kramer.

976 A. I was talking about all of them, but I will designate them hereafter.

By Mr. MCCLERNAN:

Q. Go ahead with your answer.

A. On all the charts, the figures at the left show stream flow in cubic feet per second. On this particular chart, Exhibit 140, which shows variations in stream flow at Ivanhoe, the lowest left-hand figure is one thousand cubic feet per second. The interval between each number is one thousand cubic feet, this is one thousand, two thousand, three thousand, on up to thirteen thousand. The numbers along the bottom of the exhibits are the dates, the first date on Exhibit 140 being March 12, and the dates are on there continuously up to and including March 31st. The end of each day is shown by the heavy line near the bottom of the curve, for instance, on March 14th, on Exhibit 140, the beginning of March 14th is indicated by a heavy line about two inches long, cutting across the curve. The end of March 14th is indicated by a similar line, about two inches long, cutting across the curve.

Noon for the day is ordinarily indicated by a dotted line. The very smallest intervals, in a horizontal direction, are one ur each.

By the WITNESS. I will now take up Government's Exhibit umber 140. This (indicating on chart) indicates the change in ream flow at Ivanhoe, Virginia, which is about 2½ miles below e Buck power plant. The Byllesby and Buck power plants e located on New River, the Byllsby power plant being the per one of the two, and is located a few miles above the Buck wer plant. The Byllesby power plant has some pondage, hich is a term used for storage when used to regulate the flow om hour to hour and not from month to month, and I think the ndage capacity is 1,200 acre-feet, but the Buck power plant s a smaller pondage of 200 acre-feet. By means of these reservoirs and letting the water through the turbines and also through the gates, they are able to get a varying stream flow as indicated on this chart, the point of measure-ent being only a few miles below the lower plant. This is fairly presentative of the flow immediately below the lower plant. here might be some small change, but not significant.

By Mr. MCCLERNAN:

Q. What is the vertical scale there?

A. The vertical scale is 500 cubic feet per second for an inch. very small line in the vertical direction represents 50 cubic feet r second. That scale has been used on all of these Exhibits, both r the days and hours and change in flow in cubic feet per second. I would like to describe first—I have numbered these waves, be-nning with the wave on March 12, 1930, at the Ivanhoe plant, d making that Wave Number 1, and so on, numbering the waves, to and including the wave at 18.

By Mr. JACKSON:

Q. What is the date of Number 18?

A. At Ivanhoe, the peak of wave 18 occurred at eight o'clock at ght—that afternoon—in the evening of March 27th.

Q. Are those numbers that you put on the chart?

A. I put those numbers on myself in red on the chart—on the art those red numbers, numbering the waves.

By the WITNESS. The capacity of the pondage at the two plants s not sufficient to create waves at the crest for very long periods. other words, the reservoir would be emptied in a very short ne, if they attempted to create waves over long periods. For tance, waves with the amplitude as wave Number Four created Ivanhoe, March 15th, at its maximum reading was 6,052 feet; minimum reading for trough was 300 second-feet, approxi-

mately. The amplitude of that wave (referring to papers) was about 5,900 cubic feet per second. The change in stream flow was 5,900 cubic feet per second. The period——

By Mr. McGERNAN. Stand back a little so that the Court can see the charts.

978 By the WITNESS. I will have to get close to them to see them myself. The period of the crest of that wave was about eight hours and the period of the trough was about sixteen hours.

By Mr. JACKSON:

Q. Which number is that?

A. It is wave No. 4. That type of wave had a greater amplitude of crest than most of the waves they produced. That is a type of wave with the trough and crest somewhat in the same proportion. The reason I refer to that wave particularly is for that reason. It was as persistent as any other wave I have to describe. Wave No. 13, while the flow varied from twelve thousand one hundred and fifty second feet to about two hundred fifty second feet——

By Mr. JACKSON (interrupting):

Q. What is the date of that wave?

A. March 24th, as shown on the chart; the time at the maximum flow, at the time the maximum flow was realized was only about one hour. The wave, itself, that is measured at the time at the point on the chart where the average flow of the cycle would be, was approximately two hours.

I would like to describe now that wave No. 4, as it showed at Lock No. 2—that is on Kanawha River a few miles below Kanawha Falls.

By Mr. JACKSON:

Q. Give the date of wave No. 4—when it was initiated.

A. March 15, 1930. I have traced these waves from point to point of use of all of these diagrams [indicating]. It would not be possible—it might be possible, but it would not be as certain of the wave, if you tried to take this chart, Exhibit No. 140, and then have gone immediately to Exhibit No. 141, but, with the use of the other exhibits, it is possible to identify the wave absolutely as it proceeds down. However, there is another point that enables you to identify the wave.

On March 19, as shown on Exhibit 140, you will note a number of lines up and down, between, as I have shown on chart wave 8 and wave 9. That same condition can be observed on
979 Exhibit 141 as occurring on March 18, although the small lines have smoothed down into a smoothed curve.

Q. What wave do you refer to as being observed March 18th, on Exhibit 141?

A. I am talking about Wave No. 8 now.

Q. Wave No. 8?

A. Yes, sir; I changed to Wave No. 8.

Q. What is the date of Wave No. 8?

A. March 19th, at Ivanhoe, March 19th and 20th.

Q. You say that you observed Lock No. 2 on March 18th.

A. (Witness refers to charts.) I guess I am wrong about that; this is March—between March 21st and 22nd.

Q. March 21st and 22nd?

A. Yes, sir. Referring back to Wave No. 4, the crest of that wave at Ivanhoe was about 6,124 second-feet. This may be different slightly from the figures on the chart. They are figures that I computed independently from the hydrograph and the gauges filed by Mr. Derzulaitis and Mr. Kessler here before these exhibits were filed. I think they are in substantial agreement. The flow at the crest was 6,124 second-feet; the flow at trough was 258 second-feet; the amplitude of the wave was 5,866 second-feet. The average flow——

By Mr. JACKSON (interrupting):

Was that 5,866 second-feet?

A. Yes, sir; the average flow for the wave was 2,366 second-feet; the amplitude of the crest was 3,758 second-feet; and the amplitude of the trough was 2,108 second-feet.

By Mr. JACKSON:

Q. I didn't get your statement as to the figure for the trough—2 and some feet.

A. The amplitude of the trough was 2,108 feet—second-feet.

Q. No; the second figure—your said the crest of the wave was 6,124, at Ivanhoe and the trough of the wave at Ivanhoe, didn't you?

980 A. Yes, sir; the trough is 258 second-feet. I will now give the periods more accurately than I would be able to read it here, because the charts that I prepared are much longer to the vertical scale. The period of crest was six hours; the period of trough was seventeen hours. That wave took fifty-two and a half hours to travel to Lock No. 2.

Q. It would take how many?

A. It would take fifty-two and a half hours.

Q. That is from Ivanhoe or from the plant?

A. From Ivanhoe. We have No. 4 on Exhibit 141, as shown to the crest on the afternoon of March 17th. The trough of the wave occurred about noon on March 17th, and the crest roughly about six o'clock that afternoon. These figures that we have in

regard to the time of travel might not agree exactly when I read them here, because it is difficult to read them within an hour on this blue print.

At Lock No. 2, the crest of the wave read 14,200 second-feet; the trough of the wave read 12,150 second-feet, making an amplitude of the wave 2,050 second-feet.

I might say that Ivanhoe is located 192 miles above the mouth of New River, and this plant here is located—I mean this Lock No. 2, is located thirteen miles below the mouth of New River, making the whole distance two hundred and five or two hundred and six miles.

By Mr. JACKSON:

Q. I don't understand that. I thought you said Lock No. 2 was one hundred and ninety-two—Oh, I beg your pardon, you said Ivanhoe—above the mouth of New River. I beg your pardon.

A. Yes, sir; the whole distance is about two hundred and five miles. I should state here also that the Radford Plant is located forty-six miles below Ivanhoe.

The amplitude of the crest of the wave at Lock No. 2 was 1,322 second-feet. The amplitude of the trough was 728 feet.

By Mr. MCCLERNAN:

Q. Didn't you give us figures on that already?

A. No, sir; not about Lock No. 2. I gave the amplitude
981 of the wave, but not of the crest of the trough. The amplitude of the wave was thirty-five percent of the amplitude at Ivanhoe, a point forty-six miles above Radford. The amplitude of the trough—no; I will read the crest first—the amplitude of the crest was also thirty-five percent of the amplitude of the wave at Ivanhoe. The amplitude of the wave; yes—I read that.

The amplitude of the trough was thirty-four percent of the amplitude at Ivanhoe. This wave was also observed at Radford, as shown by Exhibit 138. The percentages applied back to Radford instead of at Ivanhoe are for the wave which is forty-two percent; for the crest, forty-five percent, and for the trough—no; I am reading wrong, I beg your pardon. I have only the amplitude for the wave at Radford and not the crest and the trough. I would like to withdraw the last figure I put in.

By the COURT:

Q. What was that?

A. Forty-two percent.

Q. Forty-two percent of the amplitude at Ivanhoe?

A. At Radford; the amplitude at Lock No. 2 was forty-two percent of the amplitude at Radford, or thirty-five percent of the ampltiude at Ivanhoe. The wave had decreased some going from Ivanhoe to Radford.

By Mr. JACKSON:

Q. You said thirty-five.

A. I said thirty-five, that is right; yes, sir. I would like to have this exhibit placed on the pedestal. [The exhibit is arranged.] Exhibit No. 138 shows variations of stream flow at what is called Damsite A, at Radford, Virginia.

Q. Exhibit No. 138?

A. Yes, sir.

By the COURT:

Q. That is the site of the proposed dam, is it?

A. I think it is approximately the site of the proposed dam; yes, sir.

By Mr. MCCLERNAN:

Q. But not the same dam involved in this suit?

982 A. That is within a few miles of it, and practically the same site so far as this study is concerned. Wave 4 reached Radford Damsite A about—the peak, from about midnight between March 15th and March 16th, the trough—in this case I am describing the trough that precedes the wave—it reached there about 5 P. M., March 15th.

By Mr. JACKSON:

Q. Change your trough time and see if you have made a mistake in reading that chart. It is hard to read, it is so dim.

A. [Witness examines chart.] About 7:00 P. M., or 8:00 P. M., March, 15th.

Q. Yes, sir.

A. Yes, sir; did I state that.

Q. You said midnight.

A. No; I said the crest was midnight.

Q. I beg your pardon.

A. March 15th and 16th.

Q. And this should be 7:00 or 8:00 P. M., for the trough that preceded the crest?

A. Yes, sir; the maximum stream flow at Radford was 6,450 second-feet and the minimum flow 1,550 second-feet.

Q. The maximum was what?

A. The maximum was 6,450 second-feet, giving an amplitude of 4,900 second-feet. You can observe by the chart the mean flow was 3,170 second-feet of the cycle of the wave.

Q. Does that appear on the chart?

A. No; it does not. That is computed, and as I stated, I am reading the figures that I computed from the gauge heights and hydrographs, as they were exhibits from which these are platted

under the direction of Mr. Derzulaitis, and the figures may be slightly different, because in interpreting gauge heights from rating curves, it is easy to make an error of a hundred second-feet in some cases.

The period of the crest was nine hours, and the period of the trough fifteen hours; but the length of time that the high
983 flow of 6,450 second-feet occurred was very short. As shown by the chart, it was for some time less than one hour, and even that—a crest of that short duration, the percentages that I have stated, obtained.

By Mr. McCLERNAN:

Q. Now, Mr. Kramer, are you familiar with the plans of the proposed Radford project which were filed by the defendant with the Federal Power Commission in 1930 or 1931 and which are in evidence here somewhere? Have you examined them?

A. Yes; I have.

Q. I hand you Government Exhibit 90–A. Are those the plans to which you referred?

A. Yes; they are.

Q. It is admitted in the answer to the bill of complaint that the dam proposed to be erected will have 100,000 acre-feet of utilizable storage with a draw-down of 27 feet and that its turbines will have a capacity of 9,000 cubic feet per second. There has been evidence here to the effect that the average flow of the river at the Radford dam site over a 28-year period was 3,211 cubic feet per second. Upon the basis of that information and the blueprints, Exhibits 133 to 141, which you have been discussing, can you tell us what differences, if any, there will be between waves which could be created by the operation of the Radford project and the waves which were created by the operation of the Buck and Byllesby dams in 1930?

A. The capacity of the reservoir with 27,000 acre-feet storage——

Q. 100,000 acre-feet storage?

A. 100,000 acre-feet storage with a 27-foot draw-down——

By the COURT:

Q. What do you mean by a 27-foot draw-down? That is the water in the reservoir can be lowered that much in the operation of the plant?

A. It can be lowered 27 feet and make available 100,000 acre-feet storage.

984 By Mr. McCLERNAN:

Q. Can you explain that to the court a little more explicitly?

A. The reservoir has an area of somewhere around 4,600 acres. By drawing the water down 27 feet they can make available for use 100,000 acre-feet of water through their power plant.

By the COURT:

Q. Supposing the reservoir is filled to the height of the dam, then by drawing it down 27 feet they will have used or had the use of 100,000 acre-feet of water?

A. That is right.

Q. Why do you use a figure of 27 feet draw-down?

A. That figure is the answer of the defendant as an agreed figure. In other words, if they drew down 27 feet they would get 100,000 acre-feet of storage. It was also used at a hearing in Virginia before the Corporation Commission, given to that Commission by Col. Scheidenhelm as the draw-down on the reservoir.

Q. (The question was read as follows: It is admitted in the answer to the bill of complaint that the dam proposed to be erected will have 100,000 acre-feet of utilizable storage with a draw-down of 27 feet and that its turbines will have a capacity of 9,000 cubic feet per second. There has been in evidence here to the effect that the average flow of the river at the Radford dam site over a 28-year period was 3,211 cubic feet per second. Upon the basis of that information and the blue prints, Exhibits 133 to 141, which you have been discussing, can you tell us what differences, if any, there will be between waves which could be created by the operation of the Radford project and the waves which were created by the operation of the Buck and Byllesby dams in 1930?)

A. It would be possible, in order to take the peak off the load of the Appalachian Electric Power Company to shut down the plant Friday night and start it Monday morning about seven o'clock, shutting down probably at ten o'clock Friday night, letting no flow go out for a period of about 57 hours. It was not possible to do that at the Buck and Byllesby plants because the reservoirs were not great enough to cut off the flow very
985 long. The flow that was occurring there was such that it would fill the reservoirs up in such less time than that, probably a matter of four or five hours if the water was shut off completely. The Radford plant would be capable of releasing and using 9,000 cubic feet of water per second and letting that out for a period long enough to take care of their peaks, so instead of the crest of the wave, as shown at Ivanhoe, the very point of the crest, only lasting for an hour or so, the 9,000 second-feet flow would last for some ten or eleven hours. The waves of that type would be much more persistent downstream, both in magnitude and in distance.

By Mr. McCLERNAN:

Q. You have testified concerning the importance of the period of the trough and period of the crest of the wave. Would that feature enter into the difference between the Radford waves you have been discussing and the Buck and Byllesby waves?

A. It would; yes.

Q. In what way?

A. The way I have just explained, that the period of the trough over a week end could be from probably ten or eleven P. M., Friday, until seven A. M., Monday, instead of some eight or eleven hours as shown on these charts.

Q. And would that difference affect the distance to which the effects would persist downstream?

A. It would.

Q. In what way?

A. The wave would persist to a much greater distance and to a much greater degree.

Q. You have just said, Mr. Kramer, I believe, that the Radford reservoir, if constructed according to plans, could shut off the entire flow of the river for a period of some 57 hours. Do you mean that that would be true at any time of the year?

A. Yes. Of course, you could shut it off for longer period, but I was describing the possible method of operating it as a pond. In addition to that, they could store water from months of
986 high flow to months of low flow, but I was describing the daily and weekly waves that might be created.

Q. What I was getting at, would it be possible in periods of very high flow of the stream to shut it off for that long?

A. I have to assume some flow. It could be shut off, if it was empty, until it was full. That would be for 100,000 acre feet the equivalent of about 1,660 second-feet flow per month, so it could be shut down in that proportion to fill it up.

Q. You have mentioned the load which the Appalachian electric Power Company system carries. Do you know the nature of that load?

A. I do.

Q. Where did you get your information?

A. I got it from the data filed with the Federal Power Commission in the National Power Survey recently conducted by the Commission, filed by the Appalachian Electric Power Company.

Q. You say recently. When was that?

A. Well, for the last several years, particularly in 1935.

Q. Have you depicted that load curve in any manner, or any diagram or chart?

A. I have for three days.

(Exhibit 142 offered in evidence.)

By Mr. McCLERNAN:

Q. I call your attention to Government Exhibit 142 which is entitled "System Load Curve, Appalachian Electric Power Company and American Gas & Electric Company," and bears dates—week-day, October 28th, 1935, Saturday, November 2nd, 1935, and Sunday, November 3rd, 1935. Is that the diagram, or chart, to which you referred?

A. It is.

Q. Does it correctly represent the information which you found in this report made by the Appalachian Electric Power Company?

A. It does.

Q. Mr. Kramer, will you explain briefly what the various 987 figures and lines on the chart mean?

A. The chart is intended to show the load on the entire system of the Appalachian Electric Power Company. The numbers on the left of the chart show the load in kilowatts. The figures at the bottom of the chart show the hours of the day, beginning at midnight on one and ending at midnight the following day.

By Mr. JACKSON:

Q. Your heading confuses me in view of your statement. It says "Appalachian Electric Power Company and American Gas & Electric Company." Is that the same thing as you have used it in your chart?

A. It is given as it was filed with the Commission but it would be more correct to leave the American Gas & Electric Company out of it because it is a part of the system operated by the Appalachian Electric Power Company.

Q. You have attempted to take only that part of the American Gas & Electric Company system which is operated by the Appalachian Electric Power Company?

A. I took it as it was given in the file.

Q. You understood it to be only figures for the Appalachian Electric Power Company?

A. I verified it by other figures that were in the same document.

Q. I wanted to be sure what it purported to show?

A. This indicates that about 5 A. M. on October 28, 1935, the load on the system was 115,000 kilowatts. It increased a little after 9 A. M. to 260,000 kilowatts with an overall peak of 271,000 kilowatts occurring between 10 and 11 A. M. There was a trough or depression in the curve about 5 P. M. in the afternoon, decreasing to about 210,000 kilowatts and the load went up about 6 P. M. to 240,000 kilowatts. From 10 P. M. at 200,000 kilowatts it decreased and was less than that for the remainder of the day.

On Saturday, November 2nd, 1935, at no time during the day did the load exceed 190,000 kilowatts. On Sunday, November 3rd, 1935, at no time during the day did the load exceed 140,000 kilowatts.

By Mr. JACKSON:

Q. You misread the last one.

988 A. I should say about 170,000 kilowatts.

By Mr. MCCLERNAN:

Q. Mr. Kramer, why did you select those particular dates?

A. They were the dates filed as representative of 1935, weekdays and Saturdays and Sundays.

Q. They were selected by the Appalachian Electric Power Company and not by you; is that right?

A. That is right.

989 AVOWAL

Mr. MCCLERNAN. Your Honor will recall there was some discussion yesterday concerning the observations made by Mr. Kramer on the Pitt, Sacramento and Klamath Rivers. I am not satisfied with the record I made and, for the sake of the record, I would like to make some offers of proof.

The COURT. Dictate into the record what you propose to do.

Mr. MCCLERNAN. The Government now offers to prove by the witness on the stand that as a result of his observations on the Pitt and Sacramento Rivers in 1925, he found that waves created at the Pitt-3 Power plant, already mentioned in the witness' testimony, persisted below the point of generation to a substantial degree for a distance of 128 miles, namely to the Red Bluff Gage, and further offers to prove by the same witness that while the Pitt and Sacramento Rivers are not in every respect comparable to the New and Kanawha Rivers, there are substantial stretches in the Pitt and Sacramento Rivers that are substantially comparable to like substantial stretches in the New and Kanawha Rivers and sufficiently so to enable an experienced hydraulic engineer to form a reliable opinion from observations such as were made by this witness on the Pitt and Sacramento concerning what would be the distance and degree of persistence of similar waves on the New and Kanawha Rivers.

Mr. JACKSON. We object, of course, to the offer of proof.

The COURT. The court will permit the witness, out of his experience and observations, to express his opinion as to conditions that exist in New River and the Kanawha as to what are referred to here as the waves, but I do not think it permissible that

990 the actual data relating to the other rivers should be introduced as evidence of what will occur on the New River

unless very accurate and close comparison is shown between the topographical features of the New River with the others.

Mr. McCLERNAN. I understand the record may show our exception.

The COURT. So far as your offer is to develop the opinion of this witness as to what will happen on the New River, the court will permit that to be done, but that is not to be proven by actual data as to what did occur on the other rivers.

Mr. McCLERNAN. I understood your Honor's views but I would like to get these in the record. The Government offers to prove by the witness on the stand that as a result of his observations on the Klamath River in 1927, he found that the waves created at the Copoco Power Plant, located on the Klamath River about 198 miles above its mouth, already mentioned in the witness' testimony, persisted below the point of generation to a substantial degree, for a distance of 133 miles, namely to the Somes Bar Gage, and further offers to prove by the same witness that while the Klamath River is not in every respect comparable to the New and Kanawha Rivers, there are substantial stretches in the Klamath River that are substantially comparable to like substantial stretches in the New and Kanawha Rivers and sufficiently so to enable a hydraulic engineer to form a reliable opinion from observations such as were made by this witness on the Klamath River concerning what would be the distance and degree of persistence of similar waves on the New and Kanawha Rivers.

Mr. JACKSON. We object to the offer of proof as an offer to prove incompetent, irrelevant and immaterial evidence and an attempt to bring in collateral issues.

991. The COURT. The comment which the court made a few moments ago in regard to the previous offer will stand as to this one.

Mr. McCLERNAN. And the record will show our exception. The Government now offers to prove by the witness on the stand that as the result of his observations on the Klamath River in 1935, he found that the waves created at the Copco Power Plant located on the Klamath River about 198 miles above its mouth, already mentioned in the witness' testimony, persisted below the point of generation to a substantial degree for a distance of 198 miles, namely to the Requa Gage and further offers to prove by the same witness that while the Klamath River is not in every respect comparable to the New and Kanawha Rivers, there are substantial stretches in the Klamath River that are substantially comparable to like substantial stretches in the New and Kanawha Rivers and sufficiently so as to enable a hydraulic engineer to form a reliable opinion from observations such as were made by this witness on the Klamath River concerning what would be the

distance and degree of persistence of similar waves on the New and Kanawha Rivers.

Mr. JACKSON. The same objection.

The COURT. The ruling of the court is the same as in regard to the previous offers.

Mr. MCCLERNAN. And may the record show our exception?

By Mr. MCCLERNAN:

Q. Mr. Kramer, you recall yesterday we were talking about the extent to which the Radford dam, as proposed to be constructed, could shut off the entire flow of the river at that point, and my recollection is that you said that at any time the dam could shut off the entire flow of the river for as long as a month. Do you
992 wish to make any correction in that statement?

A. Yes. If I made that statement, it is not correct. It could not shut the river off for a month in times of high flow. In times of low flow it could shut the river off completely for a month if the reservoir was drawn down the 27 feet at the beginning of the month. For instance, if the stream flow was 1600 second-feet for the mouth and the reservoir was drawn down 27 feet, they could shut the water off completely for one month, because that is about the capacity of the reservoir for the 27-foot draw-down, expressed in second-feet months instead of second-feet.

Q. I believe at the time of adjournment we were discussing Government Exhibit No. 142, and you were about to compare the loads as shown for the Sunday with the loads as shown for a weekday?

A. Yes.

Q. Will you state briefly what the difference is between the weekday load and the Saturday and Sunday load?

A. The weekday load from 7 A. M. to 10 P. M. is above 200,000 kilowatts. From 10 P. M. to midnight and from midnight to 7 A. M. it is below 200,000 kilowatts. For all times on Saturdays and Sundays it is below 200,000 kilowatts.

Q. Are you familiar with the installation, both steam and hydro, of the Appalachian Electric Power Company?

A. I am.

Q. What is the steam installation?

A. 340,000 kilowatts approximately.

Q. And the hydro installation?

A. 74,000 approximately.

Q. Do you wish to refresh your memory on that last figure?

A. No; that is the correct figure.

Q. Does that include the London and Marmet plants?

A. Yes; that includes the London and Marmet plants.

993 Q. Would the hydro capacity in all of these plants be available in times of low flow in the stream?

A. It would not.

Q. Why is that?

A. The ability of the plants to use water is greater than the amount of water available in times of low flow. The plants do not have large storage capacities such as the Radford plant, so that they could use a little more than the low flow. The Buck and Byllesby plants and the London pool have a small capacity so that they will be able to carry some of the peak, but not anywhere near as much in proportion to the capacity as could be carried by the proposed Radford plant.

Q. From these facts concerning the type of load which you have explained to us, and the comparative steam and hydro installations, can you draw any conclusion as to what will be the most economical method of operating the steam and hydro plants?

A. It will be most economical in times of low flow to carry the peaks at the Radford plant, as much of the peak as possible, and to carry the base load, as much as possible, on the steam plants. In times of high flow the reverse would be true. The Radford plant would generate as many kilowatts as it could with the water available and the peak loads which would be smaller would be carried on the steam plants.

Q. Do your conclusions agree with the plans which the company has filed in connection with its application for a license and subsequently?

Mr. JACKSON. I object to that question. If the plans are in evidence before the court, they will speak for themselves and the conclusions can be compared. If they are not, I think they should be.

Mr. MCCLERNAN. The question is probably inaptly phrased, but insofar as Mr. Jackson's objection is concerned, I submit the interpretation of the plans is a matter for an expert.

The COURT. I think that is true. Are the plans before the court?

Mr. MCCLERNAN. Yes.

Mr. JACKSON. Are there any operating plans before the court, Mr. McClernan?

The COURT. What I meant by the plans was the blue print drawings relating to the structure and whether or not the witness has examined them and knows what is proposed to be done there.

Mr. MCCLERNAN. My recollection it was developed yesterday that he had examined them but we can go over it again very quickly.

The COURT. I think that is the subject of expert testimony.

Mr. JACKSON. The basis of my objection is not that the witness doesn't know what the physical structures are, but the question calls for a statement as to whether the opinion expressed by the

witness as to a possible method of operation of this system coincides with the plans filed by the defendant and there are no operating plans filed by the defendant, and it is manifestly improper.

The COURT. Mr. McClernan says he thought possibly the question was inaptly phrased, but you can ask him again. What is it you want to develop?

By Mr. MCCLERNAN:

Q. Mr. Kramer, I show you Government Exhibit No. 90-A which purports to contain, among other exhibits, certain plans for the construction of the proposed Radford dam, dated upon various dates. Have you examined that exhibit?

A. Yes; I have.

994 Q. From the plans for construction of the dam, which are contained in the exhibit, are you able to draw any conclusions concerning the manner in which the plant will be operated?

Mr. JACKSON. I object to that question because it appears on the face of Exhibit No. 90-A that there is nothing as to how it would be operated. If the question was changed to read as to how it could be operated, how the physical structures shown on Exhibit 90-A could be operated, I have no objection to it, but there is nothing in Exhibit 90-A as a basis for a question as to how it would be operated.

The COURT. I expect you are right about that. It might not be operated at all, as far as that is concerned.

Mr. JACKSON. Or it might be operated in a variety of ways. I think you had better phrase your question to ask how it could be operated.

By Mr. MCCLERNAN:

Q. Mr. Kramer, from your examination of that exhibit, particularly the plans for construction of the dam, are you able to draw any conclusions concerning the manner in which the plant will be operated if it were operated to the best economical advantage of the defendant?

Mr. JACKSON. I object to that because I think it should still read how it could be operated.

The COURT. I think that question is proper.

Mr. JACKSON. Exception noted.

A. It is necessary to also consider the defendant's answer and this load curve and other data to draw that conclusion.

By Mr. MCCLERNAN:

Q. Upon the basis of the construction plans contained in Exhibit 90-A and the information concerning the load which you have given us and the admissions in the defendant's answer con-

cerning the utilizable storage in the pool and the hydraulic capacity of the turbines, are you able to draw any conclusions concerning the manner in which the plant would be operated if it were operated to the best economical advantage of the defendant?

Mr. JACKSON. May the record show our same objection to the repetition of the question, the ruling and the exception?

The COURT. Yes.

A. It is my opinion that it would be most economical to operate the plant in times of low flow to carry peak loads up to the extent of its capacity with the varying stream flow. I have this opinion for the reason that the plant can use 9,000 cubic feet of water per second which is only available less than 4 percent of the time. It would, therefore, be uneconomical to have that installation and only use it to its full capacity 4 percent of the time.

By Mr. MCCLERNAN:

Q. How can it be used for a greater percent of the time?

A. By operating it as a peak plant.

Q. By means of——

A. Storing water over night, using it in the daytime, storing water over Saturdays and Sundays when the load is low and using it throughout the remainder of the week in the daytime when the load is high.

995 By the COURT:

Q. What is the generating capacity of that plant?

A. About 70,000 kilowatts.

By Mr. MCCLERNAN:

Q. Mr. Kramer, as a matter of figures, what is the relation between a kilowatt and a horsepower?

Mr. JACKSON. That is, of course, dependent upon water as to what the capacity of the plant is.

The COURT. What I meant was its maximum capacity or rather what power would be developed at that plant by the use of the 9,000 cubic feet per second.

A. About 70,000 kilowatts—possibly a little more if the efficiency is a little higher than the efficiency I used, but that answer is approximately correct.

By Mr. CLERNAN:

Q. What would that be in terms of horsepower, Mr. Kramer?

A. I would have to figure it out. It is somewhere around 100,000 horsepower.

Q. Do you know the relationship between a kilowatt and a horsepower?

A. A kilowatt is about three-fourths of a horsepower. No; I said that wrong. A horsepower is about three-fourths of a kilowatt.

Q. What is a kilowatt hour?

A. A kilowatt hour is the energy that a kilowatt will generate if operating for one hour.

Q. Referring again to steam installations, is there any particular reason why a steam plant could not be operated as well to carry a varying load as to carrying a uniform load?

A. An efficient steam plant can turn out kilowatts cheaper operating on a base load than it can on a varying load.

Q. Why?

A. It takes a certain number of B. t. u.'s or, you might say, pounds of coal or barrels of oil or a thousand cubic feet of gas—whatever you are using for fuel—to keep the boilers and steam turbines warmed up. In addition to that, it takes a certain number of pounds of coal to generate each kilowatt hour that the plant turns out. The more kilowatt hours you turn out, the less amount of coal you will use per kilowatt hour or whatever other kind of fuel you may be using.

996 By Mr. McCLERNAN:

Q. Assuming that construction and that stream flow, would the defendant, as a matter of meeting its load curve, find it necessary to provide any additional installation?

A. I will have to explain that answer. You had an assumption there of a flow of 2,000 second-feet?

Q. Yes; and that the plant was using only that flow?

A. With a flow of 2,000 second-feet, if the plant uses that flow uniformly, it can only generate about 15,000 kilowatts. If it stored water over Saturday and Sunday and operated on the peak of that load curve shown for the weekday, October 28th, it could carry 62,000 kilowatts. It would take the top 62,000 kilowatts off the load curve. The peak there shows 271,000 kilowatts. That would mean there would be 209,000 kilowatts to be carried by other plants whereas if the plant only generated 15,000 kilowatts, it would mean 256,000 kilowatts would have to be provided for elsewhere. This is true during the period that a flow of 2,000 second-feet of water was flowing. There are years when this amount of water is not flowing for a number of months. These years occur, or have occurred in about the last twenty-year period, a little over half the time; that is, in the last twenty year period there are probably eleven years that by drawing down the storage in the reservoir they could not have provided 2,000 second-feet of water. They would have emptied the reservoir before the end of the dry period. That would mean that they would have to have a steam plant, if they operated the plant as I am describing it to carry this 62,000 kilo-

997 watts of the load for a short period, approximately one year out of two. This could be done by an inefficient steam plant that had become somewhat obsolete for the reason that it would be operated a very short time, approximately every other year, whereas if they operated the plant on a base load, carrying only 15,000 kilowatts with the 2,000 second-feet, it would not be economical to run such an inefficient steam plant. It would be necessary or it would be more economical to build a new efficient steam plant, so that explanation, I think, gives the answer that it would save them from providing new, more efficient, installation.

Q. If the Radford plant were operated to carry peak loads as you have described, what would be the result upon the stream flow below the dam?

A. In times of low flow the streams would vary from zero or from nearly zero to 9,000 cubic feet of water per second. If the water was shut off over Saturday and Sunday as I have described, it is my opinion that this shut-off, in other words, reduction from the average flow, would be 75 percent effective at the mouth of the Kanawha River, about 85 percent effective at the Kanawha Falls which is approximately at the head of navigation on the Kanawha River. It is my opinion that the depths along New River would be reduced below what they would have been had the river run at its normal flow for an amount varying from about $\frac{9}{10}$ of a foot at Kanawha Falls to 1.7 feet at Eggleston. It is my opinion that the total variation in depth, that is between the lowest depth and the highest depth as the waves pass, would vary from about 2 feet at Kanawha Falls to about 4 feet at Eggleston.

Q. Mr. Kramer, assuming a flow of 2,000 cubic feet per second at the Radford dam site and the dam constructed as has been discussed and that this flow is entirely cut off for a period
998 of 57 hours, to what extent, in your opinion, would this reduction in volume of flow persist to the mouth of the Kanawha River?

A. I answered that in the last question, 75 percent.

Q. Did you say to the mouth of the Kanawha River?

A. Yes.

Q. What would that be in terms of second feet?

A. 1,500 second-feet.

Q. If such a flow, or a flow of 1,500 second-feet, were cut off in such a manner for a period of a week, to what extent would the reduction in volume of flow persist to the mouth of the Kanawha?

A. The longer it is shut off, the more nearly it approaches 100 percent reduction. I don't believe it would quite be 100 percent, but it would approach it so closely that I wouldn't like to estimate the difference between what would happen and a 100 percent reduction.

By Mr. JACKSON:

Q. You spoke of a figure of 1,500 second-feet. I didn't understand what that was?

A. That is 75 percent of 2,000 second-feet. We were assuming an average flow of 2,000 second-feet at Ivanhoe and a reduction of 75 percent.

Q. All your answers at this point were on a flow of 2,000 second-feet?

A. That is correct.

By the COURT:

Q. I don't believe I understand the effect of that answer, exactly what is meant. Can you explain it a little bit more? If you cut the flow of 2,000 second-feet off for 57 hours, no part of that flow goes down the river, does it?

A. I think there would be part of it going down the river. I don't think there would be 100 percent reduction.

Q. Where would the 25 percent come from that would go down?

999 A. At the lower end of the wave the water would lag behind the crest and that water would stop along the stream in pools and would gradually run down. That is a distance of two hundred some odd miles. It would take that length of time to dry the stream out or the upper part of it out.

Q. You mean it would be reflected in its effect to the extent of 75 percent down below?

A. Yes, sir.

By Mr. MCCLERNAN:

Q. Mr. Kramer, during your investigation of these matters, did you examine the application for a license which was filed by the defendant with the Federal Power Commission?

A. Yes; I did.

A. Aren't you referring to the one you have just shown me?

By Mr. MCCLERNAN:

Q. I show you exhibit 90-A which merely holds the plans. Didn't you examine the original application for license which was filed with the Federal Power Commission?

A. Yes.

By Mr. MCCLERNAN:

Q. Do you recall a statement in the application for a license, Mr. Kramer, which is here as Exhibit No. 90, to the effect that all power generated can be utilized as soon as available?

A. No; I don't think I can.

Q. I show you Government Exhibit No. 90 and call your attention to page No. 4, the last sentence in paragraph numbered 4,

which reads: "All power generated can be utilized as soon as available." Are you able to refresh your memory from this exhibit and say that you can now recall seeing that statement in the application for license?

A. Yes; I have seen it before.

Q. If this statement is correct, does that have any bearing upon the nature of the load which the Appalachian Electric Power Company would have?

1000 A. I think that means that they have a market for that power at the present time, probably by retiring some of their old steam plants. I dont' think it tells anything about how the plant is going to be operated.

Cross-examination by Mr. JACKSON:

XQ. Mr. Kramer, I suppose that you will agree that the Radford project, if constructed in accordance with the plans shown on Exhibit #90-a can be operated in a great variety of ways?

A. That is correct.

XQ. And that the physical possibilities range from continuous operation on what might be called the natural flow up to a wide variation in degrees of peak load operation?

A. That is correct.

XQ. And when you undertake to say that a certain method of peak load operation would, in your opinion, be the most profitable method of operation, you do not want the Court to understand you as testifying that that would be the only practicable method of operation, do you?

A. Yes; I do.

XQ. You don't want the Court to understand that would be the only practicable method of operation from the physical point of view?

A. If you substitute possible for practicable, I would say no.

XQ. Nothing impracticable from a physical or operating view, leaving aside the question of economy in operating this project on any variation of peak load?

A. The word practicable means you take into considera-

1001 tion the economy of the situation.

XQ. I am asking you to express an opinion, if you can, from an operating standpoint solely?

A. It is entirely possible to operate it in many ways solely from an operating standpoint.

XQ. Solely from that standpoint no difficulty whatever?

A. No, sir.

XQ. And in your study of this problem did you observe the Federal Power Commission twice tendered a license to this defendant upon the plans shown in Exhibit #90-a, and application shown on Exhibit #90?

A. I am not familiar with what the Federal Power Commission did. I have an understanding that is the case, but I am not sure of that.

X Q. Did you also observe in the study you made of this question that the chief of engineers had approved the plans for the construction of this project, which plans are shown on Exhibit #90-a?

A. My understanding of that was (interrupted).

X Q. I just asked for your observation.

A. My understanding of that was the final approval had to be with the Federal Power Commission, and before the Federal Power Commission makes approval it is necessary for the Army to approve it insofar as certain conditions they are concerned with obtain.

By the COURT. Mr. Jackson asked if you didn't know or understand the chief of engineers had approved it, insofar as his branch was concerned?

A. Yes, sir.

X Q. In your work with the Federal Power Commission, did you learn whether it was the practice of that Commission in examining an application for a license and the plans for
1002 a project to consider in giving its approval whether the plan was economically practicable?

A. It is their custom to do that.

X Q. And didn't you understand according to their interpretation of the Federal Water Power Act and the regulations they promulgated in examining applications for licenses they undertook to investigate, and to determine, whether the project would provide for the greatest practical use of the water resources involved, from the standpoint of the public interest?

A. Yes, sir.

X Q. And was it not their view and rule as you have discovered it, in working for that Commission, to require that the installations in licensed projects should be adequate to utilize the available water to the greatest possible advantage?

A. Yes, sir.

X Q. And in carrying out that rule and regulation has it not been the practice, under the regulations of the Commission, to study the nature of the installation proposed by an applicant?

A. It has.

X Q. From your work with the Commission are you able to say whether in examining these projects one of the matters required to be considered was the possible relation of the type of the project to the asserted right of recapture?

A. Yes, sir, they consider that.

X Q. In the course of your direct testimony, Mr. Kramer, you said that 9,000 second-feet flow would be available at the
1003 dam site only 4% of the time, did you not?

A. Yes, sir.

X Q. Were you referring to natural flow?

A. I was.

X Q. Would you regard an installation which provided only for the utilization of the natural flow practical and economical installation?

A. In some cases it would be.

X Q. Well, where you have a natural flow of 9,000 second-feet for a certain period of time, does not that mean that there is a large period of time when the flow varies somewhere between 9,000 second-feet and low water flow?

A. It does.

X Q. And isn't it a fact that during that period of time you could utilize varying volumes of water with your installation even without peaking?

A. You mean without drawing down from storage?

X Q. Yes.

A. Yes, sir. I would like to have that question read. (Question read.) That is right.

X Q. And without drawing down storage?

A. Yes, sir.

X Q. And if you chose to draw-down the storage you could use even a larger quantity of water without peaking and utilize even a larger part of your installation?

A. That is correct.

X Q. And if you used peak operations you could utilize all of your capacity for varying parts of the day during that period of time when the natural flow of the stream was between your 9,000 second-feet and low-water flow?

1004 A. That is correct.

X Q. And would there not be a very large percentage of the time between the prevalence of flows of 9,000 second-feet or better, and low-water flow, when the flow would be very substantially above low water?

A. You would have to define low water before I could answer that.

X Q. You have testified here about low water. What do you understand by it?

A. I was thinking of 2,000 second-feet and less.

X Q. Well wouldn't there be a very large part of the time between the conditions when there would be a flow of 9,000 second-feet and 2,000 second-feet when the flow would be substantially larger than 2,000 second-feet?

A. 2,000 second-feet is available 60% of the time.

X Q. Isn't more than 2,000 second-feet available more than 60% of the time?

A. No; less than 2,000 feet would be available more than 60% of the time.

X Q. Is that with storage?

A. Natural stream flow.

X Q. With storage is more than 2,000 second-feet for more than 60% of the time?

By the COURT:

Q. I think I am confused by the answers to the last few questions. I understood you to say first that observing the stream flow along that river showed that there was as much as 2,000 second-feet available 60% of the time, in the natural flow of the river?

A. Yes, sir.

Q. Then I understood you to say in answer to the next question that less than 2,000 second-feet was available 60% of the time?

A. Is available more than 60% of the time. If you take
1005 a low enough stream flow it would be available 100%. As you increase the figure the percentage that flow would be available decreases. When it gets up to 9,000 second-feet it is available less than 4% of the time.

By Mr. JACKSON:

X Q. If you utilized the storage to the best advantage for providing a flow of 2,000 second-feet, over what period of time could you provide such a flow?

A. I don't remember that figure.

X Q. Did you work it out?

A. I studied it; yes, sir. I haven't the notes here on that.

X Q. Can't you say from your own knowledge of the problem and the study you have given it, it would be more than 90% of the time?

A. I would not like to answer that.

X Q. Now you have based a lot of your testimony on the question of what you would say to be the relation between the hydraulic capacity of this installation and the period of time during which a natural flow would be available at the dam site equivalent to that hydraulic installation, haven't you, 9,000 second-feet; am I right?

A. I have based some of it.

X Q. Mr. Kramer, did you ever know the Federal Power Commission to approve an application for the construction of a power project with an impounding reservoir, that did not have an installed capacity larger than the low water natural flow of the stream?

A. I wouldn't say I did not. The physical conditions at the dam site would be taken into consideration and it might not be

any possible to do any impounding, in which case they would approve it.

X Q. Of course there wouldn't be a reservoir there?

A. I will have to have the question again.

X Q. I won't pursue it further. As the Court suggested it probably is somewhat irrelevant. Do you know whether the defendant is relying upon a 9,000 second-foot flow at all times for peak carrying purposes?

1006 A. I would assume they were certainly not relying on 9,000 second-feet of water being available at all times. I have more confidence in their consulting engineer than to think he would give such advice.

X Q. For peak carrying purposes I said.

A. The same answer applies.

X Q. Mr. Kramer, do you know what is meant by a subpeak?

A. I don't thing I could define that.

X Q. What is the term, if you know, applied to a power plant which carries a load up near the top of the load curve, but does not carry the peak?

A. I know what you are talking about, but I don't think I ever heard any special term applied to it.

X Q. Would you consider the term "subpeak" was sufficient to indicate that condition?

A. I think I understand what you are talking about.

X Q. Do you understand that I mean a plant which carries part of the load, which is on the upper part of the load curve, above the base, but not the extreme peaks of that load; do you understand that is what I mean?

A. I do.

X Q. Would it be feasible or physically possible to operate the Radford plant as a subpeak load carrier?

A. It would be physically possible.

X Q. And would it be possible to utilize plants like Buck and Byllesby, London, and Reusens to carry the extreme peak?

A. It would be physically possible, but it would not be practical.

X Q. Why wouldn't it be?

A. Because in times of low flow there is not enough water to generate the kilowatts in what you call the subpeak position

1007 on the load. There would not be enough water to generate enough kilowatts to allow the Radford plant to carry nearly as much of the load represented in kilowatts as it would be if it carried the very peak of the load. As I stated before, by carrying the very peak of the load on the day I have shown, with 2,000 second-feet, the plant could be responsible for 62,000 kilowatts. Now, as you lower the plant on that load curve the less number

of kilowatts it can be responsible for, and you lose the benefit of that additional installation.

X Q. It would operate over a longer period of the day, wouldn't it?

A. It would operate over a longer period of the day, but would not carry as large a proportion of the load, and the other plants are not suitable, you would lose some of the benefits in the other plants, because they do not have as much storage. They are more designed to work on the subpeak load than Radford and Radford is more designed to carry the peak of the load.

X Q. How do you know what the defendant designed for the Radford plant?

A. I can only judge by the plans and statements in defendant's answer and statements made by Col. Scheidenhelm before the Corporation Commission for the State of Virginia, when they applied for license to build the Radford plant, and judging from that information I would say it was their intention to operate it carrying the peak of the load.

X Q. Did you ever operate a large electric power system?

A. No, sir.

X Q. And you are now testifying as I understand it how you think this load curve you have shown on your Exhibit #142 should be apportioned among generating plants?

A. Yes, sir.

X Q. The peak of the load curve on Exhibit #142 was, of course, carried by the system of the Appalachian Electric Power Company in 1935?

A. Yes, sir.

1008 X Q. And of course no part of it was carried by the Radford project?

A. No, sir.

X Q. And you don't know how that peak was distributed among the generating plants of the Appalachian Electric Power Company on October 28, 1935, do you?

A. I have information that would tell me how the kilowatts were generated by the various plants throughout the system for various months in 1935.

X Q. For that date do you know?

A. No, sir.

X Q. And of course you don't know how the peak of the Appalachian Electric Power Company system will be distributed among generating plants in the future, with or without the Radford project?

A. I do not.

X Q. And do you know whether Buck and Byllesby plants are now operated as peak-load carriers?

A. They are.

XQ. Do you know whether or not the Appalachian Electric Power Company system is interconnected with other power company systems?

A. It is.

XQ. Do you know whether or not those power systems exchange power for peak-load purposes?

A. They have an exchange agreement which allows one company to buy power at a small sum when the other company wants to sell it and the first company wants to buy it. There is an exchange of power for peak purposes.

By the COURT:

Q. Are you familiar with the Marmet and London Dams?

A. Yes, sir.

1009 Q. What is the capacity of each of them?

A. Approximately 15,000 kilowatts when they have sufficient stream flow to generate them.

Q. Following a discharge of how many cubic feet of water?

A. I am not sure of that figure. I think it is—perhaps I had better not give it.

Q. Those dams are much lower than this proposed dam at Radford, are they not?

A. They have 24 feet head approximately each. The London plant has a pool providing a small amount of pondage, the use of which, however, is under control of the U. S. engineers and the Federal Power Commission.

Q. What I was getting at, I am not enough electrician to know whether the differences Mr. Jackson referred to, the London and Marmet dams, and nature of the plant and height of the dam, the head I believe you say, indicates that, a difference in the practical use of the different plants?

A. Would you like me to explain or compare the London and Marmet dams with the Radford?

Q. If it isn't too lengthy, yes.

A. Well, the London pool, if drawn down at the rate of 3/10 of a foot an hour provides a flow of 3,000 second-feet. I think in times of low flow that would enable the two plants to generate together 15,000 kilowatts. That would not vary the load enough throughout the day, or the twenty-four hours, to make it advisable to carry the peak of that load. The amount of water, the relation of the average amount of water, that would be available to the amount of water they could use on a peak, expressed in percentage, is not very high; whereas, the same thing expressed at Radford would allow them to take a very large amount off

1010 of that peak, because the Radford reservoir is much larger.

They could by drawing it down two feet over the week and storing it up over Sunday, when the flow was 2,000 second-feet, keep it even, and lose very little head, and in my opinion the most efficient way to operate.

Q. I mean the London and Marmet, are they better adapted for carrying base loads than the Radford dam, or which of the plants would you say could be most practically used to carry a peak load?

A. As I stated the reservoir or pond, they are not allowed to lower the Marmet pool, that has to be maintained at a certain elevation on account of navigation, but they can under restriction lower the London pool three feet, which allows it to use 2,500 acre-feet of storage. Now 2,500 acre-feet of storage in proportion to the stream flow at London and Marmet is very small. The 100,000 acre-feet of storage at Radford in proportion to the stream flow is very great, and it follows that Radford would operate on the peak load more successfully than London and Marmet, although they could carry the subpeak load very nicely.

By Mr. JACKSON:

X Q. You have just told the Court that the London and Marmet combined would produce 15,000 kilowatts; is that right?

A. I said the capacity was 15,000 each but in times of low flow I think with approximately 2,500 second-feet flowing into the London pool and by using the small pondage at the London pool, they together could carry about 15,000 kilowatts; that is lowering the reservoir at the rate of 3/10 foot per hour. They possibly might lower it more rapidly and in that case the peak they would carry would be only for a few hours, and if they were going to operate on subpeak it would be a longer period.

X Q. And if on extreme peak that short period would fit in?

A. I don't think so.

X Q. You don't know how it has been operated?

1011 A. Yes, I do; I have studied the draw-down in that reservoir every day since it has been put in there. The maximum drawdown has not exceeded 3/10 foot per hour except once when it went to 4/10.

X Q. It has been operated on a peak-load basis?

A. It is on what I would call probably subpeak.

X Q. Both the London and Marmet dams have been operated on some form of peak-load basis?

A. Yes, sir.

X Q. You just said I think that your estimate of the low water flow at London and Marmet was about 2,500 second-feet, is that right?

A. Not extreme low water. I selected that to illustrate my point.

X Q. Tell me the extreme low water?

A. I am not prepared to answer that. That has been put in evidence by a witness more competent than I am. I think his evidence will show somewhere around 1,000 second-feet, but the record will make that clear.

X Q. Now will you tell the Court what is the hydraulic capacity of the installed installation of the London power plant, maximum hydraulic capacity?

A. 15,000 kilowatts.

X Q. That isn't hydraulic capacity is it?

A. You mean in cubic feet per second?

X Q. Yes; how many cubic feet per second.

A. The Court asked that and I stated I hesitated to answer because I wasn't sure of the figures.

X Q. Didn't you study those this problem?

A. I don't remember the figures.

By Mr. JACKSON:

Q. To refresh your recollection, don't you know it to be a fact that the hydraulic capacity of the installation at the
1012 London Dam is 9,000 second-feet?

A. That was the figure I had in mind, but I was not sure of it.

Q. Just the same as at Radford?

A. Yes, sir.

Q. Nine times the low water flow if I am right in my recollection of the figures. Will you tell me what is the hydraulic capacity of the installation at the Marmet Government Dam?

A. I assume it is the same since they have the same head and the same installation.

Q. And in your study did you examine the plans for the Winfield Dam and the power plant downstream?

A. I cannot give you the hydraulic capacity there because the dam is not completed. I have studied it, but I do not recollect that I was informed of the installation and the head there, but I did take that into consideration in forming the answers I have given here to certain extent.

Q. Don't you recall that the hydraulic capacity and the installation at Winfield is even larger than at London and Marmet?

A. I would not like to answer that in a certain way. My recollection is they were somewhat the same.

By Mr. JACKSON:

Q. Mr. Kramer, you stated before recess, in answer to one question that you were familiar with the fact that the Appalachian Electric Power Company system had interconnecting connections, or exchange of power. Is that right?

A. Yes, sir.

Q. Do you know whether one of those interconnections extend southward?

A. I don't know whether it is southeast or southwest or straight south.

Q. I would think, although I am not sure my geography
1013 is perfect, that it might be a little bit southwest. I thought with your study of the problem you could state it definitely.

A. Yes.

Q. Don't you know it to be a fact that the Appalachian Electric Power Company system has interconnections, among others, with the Tennessee Electric Power Company, the Alabama Power Company and the Georgia Power Company?

A. No, sir.

Q. You are not familiar with that fact?

A. No, sir.

Q. That they are connected so that they can exchange power?

A. No, sir; they are not directly connected.

Q. But they do exchange power?

A. The reports I have studied only give the amount of power and the name of the company that gets that power, but beyond that, or if there was a third connection, I would not have any information regarding it.

Q. Do you know whether or not the Tennessee Electric Power Company, the Alabama Power Company, and the Georgia Power Company has large hydroelectric installations?

A. They have; yes, sir.

Q. And don't you know also that the periods of high and low flow for the hydroelectric plants of the Alabama Power Company and the Georgia Power Company vary from the periods of high and low flow of the hydroelectric plants of the Appalachian Electric Power Company?

A. I have never studied the flov of those streams.

Q. You are not familiar with that?

A. No, sir.

1014 Q. "If they do vary, and if there is a method of interchanging power between those companies, would that have any relation to the problem of carrying peak load"? That refers to the Tennessee Electric Power Company.

A. That was taken into consideration in my answers to the questions by the plaintiff's attorney.

Q. I thought a moment ago you told me you did not know that they had any interchange with the Tennessee Electric Power Company, the Alabama Power Company, and the Georgia Power Company.

A. I also told you——

Q. (Interrupting.) Did you tell me that?
A. What was the question?
Q. Didn't you tell me a few minutes ago that you did not know whether the Appalachian Electric Power Company had any interconnection or exchange of power with the Tennessee Electric Power Company, the Alabama Power Company, and the Georgia Power Company?
A. I told you there was no direct connection.
Q. Didn't you tell me a few minutes ago that you did not know what were the conditions of the flow on the stream where the hydroelectric plant of the Alabama, Tennessee, and Georgia Power Companies are located?
A. Yes, sir.
Q. And you say you took that into consideration when you were answering questions of counsel for the Government on your direct examination?
A. I took into consideration the amount of power bought and sold by the Appalachian Electric Power Company each month.
Q. Did you have any information as to whether that was the total amount of power which the Appalachian Electric Power Company could obtain under its interchange arrangement?
1015 A. No, I did not.
Q. And did you have any knowledge as to what amount of interchange power it would be able to obtain next year, or the year after?
A. I did not.
Q. Now you testified on your direct examination that the Appalachian Electric Power Company had 74,000 kilowatts of installed hydroelectric capacity. Is that right?
A. I said approximately.
Q. You said approximately?
A. Yes, sir.
Q. Did you take into consideration the Winfield Development?
A. No; I did not.
Q. Do you know whether or not that power has been licensed to the Appalachian Electric Power Company?
A. I understand that it is.
Q. Do you know what amount of power will be available at the Winfield Dam?
A. Not exactly. I assume it is somewhat the same as at the other two.
Q. Would you be surprised to know it is substantially larger?
A. It depends on what you mean by "substantially larger." It could be some larger, because it is further down the stream.
Q. 30 or 40 percent larger perhaps?
A. Not in low flow times, in my opinion.

Q. Is the head the same at the Winfield Dam as at the London and Marmet?

A. It is my understanding it is very nearly the same.

Q. At least in your consideration you assumed it to be substantially the same?

A. It is not constructed but I was talking about the present condition.

1016 Q. Do you have any information that would lead you to think it would not be constructed before the Radford Dam can be constructed?

A. No, sir.

By Mr. JACKSON:

Q. Mr. Kramer, you have been testifying generally as to the affect of what you have termed the wave below an hydroelectric plant. Would any reservoir down stream from such an hydroelectric plant have an effect on wave release by that plant?

A. It might or it might not have.

Q. That is, in your view, would it be immaterial whether there was a reservoir below an hydroelectric plant, so far as considering the behavior of the waves released by that plant if the reservoir were full?

A. As the wave came down there would be a minor effect but not to a sufficient extent to make a material difference, if the reservoir was not full and would operate to smooth out, why it might have an effect.

Q. It might have a very substantial effect if the reservoir were not full?

A. I would have to know the capacity of the reservoir you have under consideration and how much storage there was available when the waves struck it.

Q. Would you expect to find a flood control reservoir downstream full during a period of low water?

A. I don't think I have enough data to answer your question.

Q. Mr. Kramer, just as an engineer, don't you know that a purely flood control reservoir would not be maintained full during a period of low water so that it would have no capacity to absorb a flood after it came?

1017 A. Well, it might be that sufficient studies have been made in the stream flow to hold that head up during a low period, and draw the reservoir down some time between the time the low period occurred and the flood expected, so that they could have storage for the flood dam. Only a storage reservoir, without anything else, I think, your assumption is correct.

Q. You never knew of a flood-control reservoir that was maintained full during the low-water period, did you?

A. I know plans for them to maintain them full during very low season, but not purely flood control.

Q. I asked you regarding purely flood-control reservoirs.

A. No.

Q. Is it your idea that a flood-control reservoir should be emptied during low water and available to take the peak off the flood when it comes? Is that your idea?

A. A long period between low water and the expected flood season, or rather most all flood-control reservoirs I am familiar with had some other function such as supplying water for irrigation, supplying water for power, and I think if I answer your question, did I ever know of a flood-control reservoir that was purely operated for flood control, I would have a hard time thinking where there was one that I was familiar with.

Q. Did you ever hear of the Miami Conservancy District?

A. Yes, sir.

Q. However most of your experience has been out in the West, hasn't it?

A. And northwest.

Q. And is that country such that you have arid or dry periods and then certain definite seasons of the year when there is rain and melting of snow?

A. Yes, sir.

1018 Q. Did you examine what was the regularity of floods on the New River, when you studied this problem?

A. I did not make a very careful study of the flood situation there. I directed my attention more to the low-water condition.

Q. Did you not in your studies notice that the flood in New River may occur any month in the year?

A. I do not think I noticed any major floods in the low-flow season, which would be August, September, and October.

Q. Then is it your testimony that as a result of your study you will not say that there are no floods on New River or rather that they do not occur during the months of July, August, and September.

A. I do not think any major floods and I do not think that problem enters into my study.

Q. Did you notice in your study that the largest flood that ever occurred on New River, was on September 14, 1878?

A. No, sir.

Q. Did you know that the second largest flood was July 16, 1916?

A. No; I did not. I made no study of the flood-water conditions. I did study the low-water conditions, the years they occurred and the length when the low-flow periods occurred, and I also noted the fact that very often in these low-flow periods

that there were periods of higher flow when the reservoir could have been filled up, but when the Major floods occurred, I did not give any special consideration to it.

Q. Did you give any consideration to reservoirs at all?

A. Other than the Radford reservoir?

Q. Yes.

A. Only the ones that are now constructed.

Q. You mean what?

A. I mean the small reservoirs at Hawks Nest Plant, at
1019 Glen Feris plant, and at the London plant, and the ones above at Buck and Billesby, and the very much smaller ones above there.

Q. Yet, assuming that there should be constructed a reservoir downstream from the Radford project, with a storage capacity of 235,000 acre feet, would that have any effect upon any waves that might be produced by the proposed plant of the defendant at Radford?

A. Certainly it could.

Q. It is conceded in the complaint that the Government is going forward with the construction of a reservoir at a site known as Bluestone on the New River, and it appears from the Government Exhibit No. 120, that this reservoir will have a storage capacity for that part devoted to flood-control purposes of approximately 235,000 acre-feet. If that project is constructed and placed in operation, what, if any, bearing will it have upon the question of the possibility or effect of any wave produced by the defendant's proposed plant at Radford, persisting downstream below Bluestone?

By the COURT. I understood him to say he was familiar with the Bluestone project. Is that right?

A. No, sir; not the details.

By Mr. JACKSON:

Q. Let me ask this question. Is is necessary for you to know anything more than the project provides 235,000 acre-feet of storage for purely flood control?

A. It is necessary to have more information, in regard to the degree and the effect. The fact that such a body of water would be there at all would have some effect on the speed of the waves, even if the reservoir was full.

By Mr. JACKSON:

Q. In answering that question, Mr. Kramer, you might, if you want to, look at Government Exhibit 120, which shows a profile of the Bluestone Project and the Radford Project.

A. I know there is a Bluestone project contemplated, but
1020 whether they will ever get money enough to build it, or not,

I don't know. I know where it is going to be, how big the dam is going to be, how much storage capacity they will have, but how they operate that dam, I don't know, I never have studied it.

Q. Can you look at Exhibit 120, and tell me if there is shown a utilizable capacity of flood control of 235,000 acre-feet?

A. I could not examine it in a hurry and tell you very much about it.

Q. Mr. Kramer—first, I will have marked for identification a document known as House Document No. 91, of the 74th Congress, entitled Kanawha River, West Virginia, Virginia, and North Carolina, as defendant's Exhibit No. 512, for identification. Mr. Kramer, I direct your attention to this statement in Defendant's Exhibit No. 512, for identification, on page 94, which appears in the supplemental report of the Division Engineer to the Chief of Engineers, on Bluestone Reservoir project, dated November 21st, 1934, reading as follows: (Reading:)

"The dam in this case would also be constructed to elevation 1520, providing the same gross capacity as the flood-control project (625,600 acre-feet). Of this total capacity, 235,500 acre-feet (representing about one inch of run-off from the water-shed above the site) in the top 30 feet of the reservoir would be reserved for flood control, leaving a gross capacity of 390,100 acre-feet available for power purposes."

Assuming that this Bluestone project should be completed so as to provide that 235,500 acre-feet, included in the description I have read to you from the official report, Defendant's Exhibit 512, for identification, what, in your opinion, would be the effect upon any power waves produced by the Radford plant?

By Mr. JACKSON:

Q. Will you read the question? (The question is read.)

A. I have no assurance that that describes the operation of that reservoir. That is just a recommendation that the reservoir be built in a certain way. As to whether or not it is followed, is something I am not sure of.

1021 Q. I did not ask you to testify to that. I asked you, assuming that that would be followed, what effect it would have on the Radford project?

By the WITNESS. If the project is operated as described and the waves came when the reservoir was drawn down, it would smooth the waves out.

By Mr. JACKSON:

Q. Isn't it a fact that, if the Bluestone project be constructed and operated so as to maintain this 30-foot on the upper part of the storage reservoir, amounting to 235,500 acre-feet capacity, empty for utilization for flood control purposes during low water

flows, the condition of the flow of the stream below Bluestone would depend solely on the plant at Bluestone?

A. My opinion would be that it would largely depend on the water released from the Bluestone reservoir, except in times of flood.

By Mr. JACKSON:

Q. In low water periods, it would depend wholly on the Bluestone operation?

A. It could depend entirely on the operation at Bluestone.

Q. Assuming low water and the maintenance of the upper or flood reservoir, with the reservoir empty to take care of floods, in what respect could the conditions of flow below Bluestone depend on any other thing other than the operations of Bluestone, I mean, immediately below Blue..one?

By the WITNESS. In times of low flow, it would depend on the water released from Bluestone, assuming they followed that plan that you have outlined. May I add that, in times of flood, where there is a power plant, it is an awful temptation to fill the reservoir up, in times of low flood.

Q. Yes, sir.

A. (Continuing.) To get the full head of the plant.

By Mr. JACKSON:

Q. You think that the Government would be likely to
1022 overreach into the part that should be reserved for flood control, in order to develop power?

A. I don't know whether they would or not.

By Mr. JACKSON:

Q. What is the proposed capacity of the power installation under the Government's project at Bluestone?

A. I don't know.

Q. Don't you know it is in excess of 10,000 second-feet?

A. No, sir.

Q. Assuming, as you suggest, that the Bluestone reservoir is purely a power development, wouldn't the condition of any stream below Bluestone depend on the method of operation of the Bluestone power plant?

A. Not necessarily; the power waves might come from above when the reservoir was full.

Q. At low-water time?

A. Yes, sir.

Q. You think, if the plant at Bluestone is operated purely as a power project, that the reservoir would be kept full during low water?

A. Not full, but full sometimes during the day.

Q. You think that there would be no more drawdown on a reservoir the size of Bluestone than pondage that could be built by low water flow during the flood hours of the day?

A. That might be the way to operate it most efficiently.

Q. That is your best judgment, is it?

A. From a power standpoint.

Q. It is your judgment that, in the construction of a reservoir the size of Bluestone, which is twice the size of the Radford project, that probably the proper way to operate it as a power project would be to have the reservoir full?

A. Not at all times.

Q. During low water?

1023 A. At the beginning of low-water period, it would; yes, sir.

Q. Would there be any difference from the Radford project in that respect?

A. I don't understand you.

Q. Would the proper method of operation of Bluestone be different from the proper method at the Radford project, as a power project?

A. You mean carrying peak loads?

Q. You are telling us how it should be done. I asked whether or not, in your opinion, the proper method at Bluestone, as a power project, would be different from the proper operation of the plant at Radford, as a power project?

A. Your question is too indefinite.

Q. You cannot answer that?

A. No, sir.

Q. But I do want to get this clear—you think that Bluestone, operated as a power project, that the proper method of operation would be no draw-down of the pool or reservoir?

A. No, sir, I did not say that. I said there might be times when the reservoir would be full during low-flow periods.

Q. What period during the low-flow period would the reservoir be full?

A. At the beginning of the low-flow period.

Q. One question about your exhibit 142—the load curve. I ask this merely for the purpose of information, Mr. Kramer: Can you tell us or identify for us records from which you made that curve? This is what I want you tell us, first: the date of the sheet or whatever it may have been, or report?

A. It is a 1935 report for the first ten months of 1935.

Q. It is a report of the defendant filed with the Federal Power Commission, is it?

1024 A. Yes, sir.

Q. And that is for the first ten months of 1935?

A. Yes, sir.

Q. And why did you choose particularly this, as shown on exhibit 142?

A. There was only one week; the data is given for only one week, and I decided on Saturday, Sunday, and Monday of the week. Monday is fairly representative of the other five week days.

Q. The data that you had from it—you had this top load curve from which you got the information for a single week?

A. For one week, yes, sir.

Q. Is there anything—anything to tell whether or not that curve is typical of what will be the load of the Appalachian Electric Power Company two or three years from now?

A. No exact way. Engineers have to make estimates with the information they have, by using all available information and make a reasonable estimate, but, of course, their estimates are not always correct.

Q. On your direct examination, you expressed an opinion that, if the flow at Radford were totally cut off for a period of 57 hours, 75 percent of the effect would be transmitted to the mouth of the Kanawha River, assuming a flow of 2,000 second-feet average per day out of the Radford plant. Have I stated that correctly?

A. I think so.

Q. Now, as the basis for that opinion, what was the shape of the curve or the wave, rather, which you assumed at Radford?

A. It was a wave that would take the peak off the load, as shown by this exhibit.

Q. Can you describe it briefly but sufficiently so that we can tell the form of it?

1025 A. The flow from about eight o'clock, we will say, on Friday, would be in the neighborhood of 9,000 cubic-feet per second, until about 4.30 in the afternoon; then it would gradually decrease until the flow reduced to zero at ten o'clock Friday night; it would go up again at seven o'clock Monday morning. I think that is approximately the type of wave I was considering.

Q. Is that, in your opinion, consistent with the hypothesis of the water being shut off completely for 57 hours?

A. Yes, sir.

Q. When was the water shut off to become complete?

A. Ten o'clock Friday night until seven o'clock Monday morning.

Q. What conditions did you assume on New and Kanawha Rivers, in making your estimate, or expressing that opinion?

A. I considered low-flow period on both streams.

Q. What stream flow did you assume below the dam?

A. Below the dam?

Q. Yes?

A. The stream flow gradually increasing below the dam. I think the figure I used was 2,500 second-feet at Kanawha Falls?

Q. That is in addition to the wave?

A. No, sir; the average flow, if no interference with the wave.

Q. Can you tell me what flow you assumed coming into the river below the dam?

A. That would be 500 second-feet between Radford and Kanawha Falls, but about that—my opinion is based on flows in that neighborhood. There could be some more or some less than that, but the change would not be material for a variation of 10 or 15 per cent above or below that.

1026 Q. Do you know what proportion of the time the condition of the incoming flow of 5,000 second-feet below Radford, is obtained?

A. No, sir; I could not give you that figure.

Q. I should have said 500 second-feet.

A. I am not able to give you that figure.

Q. Don't you know the period during which that condition would prevail would be so short as to be negligible?

A. I don't think so; it would be short, but not so short as to be negligible.

Q. Tell me how short it would be.

A. I cannot give you an exact figure.

Q. Give us your best estimate.

A. I would not care to make an estimate.

Q. What conditions did you assume further on the New and Kanawha Rivers—what inflow did you assume below Kanawha Falls?

A. I did not go into that. It was not necessary to go into that, because the shut-off effective at Kanawha Falls would have some effect, regardless of the flow below for a two-day period.

Q. State whether or not it was necessary for you to make any assumption or have any information as to the inflow below Kanawha Falls?

A. No, sir; I had information, but I did not go into the assumption.

Q. You did not consider it?

A. No, sir.

Q. What conditions of the reservoirs did you assume on the Kanawha when you answered that question?

A. I assumed the reservoirs on the Kanawah to be full.

Q. You assumed them to be full?

A. Yes, sir.

1027 Q. Do you know whether or not there is a pondage at London?

A. Yes, sir.

Q. Do you know the purpose of the London Pondage?

A. Yes, sir.

Q. Isn't it to absorb both natural and artificial fluctuations?

A. Under the regulations of the Government, they may so regulate it.

Q. Didn't you find that the report of the engineers so stated?

A. I didn't see anything that led me to believe they would keep the London pool down to take care of operations above.

Q. Do you so testify—that the official reports of the London project do not show that it provides a three-foot pondage for the purpose of equalizing natural and artificial fluctuations?

A. I did not state artificial.

Q. If you want to testify to that, it is all right. Do you?

A. Yes; I don't know whether that is a requirement—that they are required, if it is.

Q. You don't know that it was not?

A. No, sir.

Q. Do you wish to testify that it was not?

A. No, sir; I assumed it was full.

Q. I did not ask you that. You have discussed your view on that enough. What did you assume about the condition of the pond at the Electro-Metallurgical plant?

A. I assumed it as being full.

Q. Which pond?

A. Well, I assumed both of them—Hawks Nest and Glen Ferris.

Q. Did you consider them?

A. Yes, sir.

Q. For what reason did you assume they were full?

A. I had no reason to know that they were not full.

1028 Q. And you had no reason to know that they would be?

A. That is correct.

Q. You also assumed the London reservoir to be full?

A. Yes, sir.

Q. And you had no reason to know it would be?

A. No, sir.

By the COURT. What plant is it that has an outlet from the dam that runs through a tunnel?

A. That is Hawks Nest.

By Mr. JACKSON:

Q. There is another plant of the same company at Kanawha Falls.

By the COURT. What I refer to is the tunnel opening on the right bank of the river.

A. The long tunnel?

By the COURT. I don't whether it is long, or how long it is.

By the WITNESS. That is the Electro-Metallurgical Company's.

Q. Mr. Kramer, I would like to ask you a few questions about your testimony in regard to the experiments which were conducted at the Buck and Billsby plants on New River, in March 1930. In your direct testimony, you said that you had made some computations of your own, in addition to the charts and graphs offered in evidence as Government's exhibits No. 133 to 141, inclusive. Briefly tell the nature of your computations.

A. Yes, sir; most of my study was based on the report made by the Huntington office of the United States Engineers. In that report, the amount of water in the wave; the period of the wave, and the amplitude of the wave, both above and below the crest, was all given. I checked some of those, but nearly all the information I worked up myself was just to check that against the information in that report.

Q. There was a report by the District Engineer, was there?

1029 A. It was a report made in the Huntington office of the United States Engineers. I don't know if it ever went out of the office.

Q. Was it, can you tell me whether or not it was a report addressed to the Chief of Engineers?

A. I don't think it was; no, sir.

Q. I hand you a book here, which is entitled "Preliminary Report of Power Waves on New and Kanawha Rivers, Engineer's Office, Huntington, West Virginia, February 29th, 1932," and ask you whether or not that is the report you refer to?

A. I think that is part of it—part of it is, I think. I think there is more in this report than in the report I had. The first part of this, I don't believe was in the report I had.

Q. You think that everything is in the book I have handed you that was in the report you covered, or examined?

A. I am not sure about that. It has the general appearance.

Q. I will ask you to examine it off the stand, and state whether or not it is. Did you examine any other official report dealing with these experiments, than the one you have referred to?

A. No, sir; I did not.

Q. You did not?

A. No, sir; except the original hydrographs.

Q. I mean in addition to the hydrographs. I meant reports. I conceived those records to be in the experiment. Did your computations extend or include computations of stream flows upon the basis of the reported gauge heights during these experiments?

A. Did I include gauge heights?

Q. No; did you make computations of stream flow from the records of the gauge heights—of the recording gauges?

A. I did, on some of them.

1030 Q. Tell me briefly how you developed this stream flow?

A. By rating tables and rating curves.

Q. You took a rating table or rating curve, which was supplied to you to be applicable to the particular gauging station, and used them, in conjunction with the record of the automatic gauge, to compute the flow?

A. Yes, sir.

Q. In connection with that work, did you have, or develop a stage chart for the readings at some or all of the gauging stations?

A. There was one that accompanied this report, that is not in the report.

Q. Did you use that?

A. Yes, sir.

Q. Have you a copy of it?

A. Not here.

Q. Will you supply a copy for us?

A. I think I can get one.

By Mr. McCLERNAN. What did you say?

By the WITNESS. I think I have a blue print here.

By Mr. JACKSON:

Q. Did you make any computation in particular about Lock No. 2, as affecting—in regard to the readings at Lock No. 2?

A. I did not; you mean as to how reliable they are?

Q. No; you said you made certain computations of stream flow in connection with certain rating curves, or tables, and records of the gauge heights, and I am asking you whether or not, among the work you did, was some of it in relation to the records at Lock No. 2?

A. Lock 2 was worked up in a report I had.

Q. It was worked up in a report that you had?

A. Yes, sir.

Q. So you had before you a stage chart for Lock No. 2?

A. Yes, sir.

1031 Q. Tell me, what was the rate of change in stage through Lock No. 2 by the waves produced by—during the experiments, as measured at the upper gauge at Lock 2—for instance, wave No. 4, the one you testified about.

A. The rate of change?

Q. In stage?

A. I could tell you if I had the blue print that I referred to.

Q. Haven't you the blue print with you?

A. No; it is not here.

Q. I produce here a chart which I will ask to have marked as Defendant's Exhibit 513, for identification. I show you a chart marked Defendant's Exhibit 513 for identification, and ask if you ever saw a copy of that chart before [handing to witness].

(Exhibit 513 marked for identification.)

A. No; the chart I saw was different from this. It had the hours on it. This only has the days divided into twelve hours periods.

Q. From that chart, can you, as an engineer, read the rate of change in stage at Lock 2?

A. [Witness examines chart.] Lock 2?

Q. The rate of change of stage in feet at Lock 2—feet per hour?

A. I cannot give it in feet per hour.

Q. At Lock 2?

A. It is different for different waves. You will have to ask for a particular wave.

Q. Tell me for wave No. 4. That is the one you testified about.

A. I can give the reduction in six hours, but not per hour.

Q. Can you read that as an engineer—read that rate per hour in the exhibit?

1032 A. This exhibit is prepared very roughly. It does not show the tenths of a foot. It gives 21 and 22 feet; there are no intervals between that—six A. M. and midnight. I have a much more accurate one than that, or have access to it.

Q. But you do not have it with you here?

A. No, sir.

Q. Isn't it possible for you to say from inspection of Exhibit 513, for identification, that the rate of change in stage—the change of stage in feet per hour, is such that it will not exceed a rate of change of more than two or three inches per hour at Lock 2?

A. You mean in wave 4, it does not exceed that?

Q. Yes?

A. It looks like the maximum rate of change in six hours is .4 of a foot.

Q. That would be approximately what per hour?

A. Two-thirds of a tenth.

Q. Would be how much in inches?

A. [Witness figures.] .8 of an inch.

Q. And from an inspection of that chart, can you say that there was no other waves shown at Lock 2, which would have a materially different rate of increase in stage in feet.

A. Wave 8, as you have marked here, and 7, and 6, are all steeper.

Q. Can you say that they would not be materially steeper—do you think they would be—I want you to find the rate of change in the steepest wave that you can pick out on the chart?

A. It looks like, from a casual inspection, that wave 10 is steepest.

Q. You say the rate of change would be .8 of an inch an hour for No. 4. Can you say whether or not it would be as much as an inch and a half in wave 10?

1033 A. It looks like this is .10 of an inch an hour; .6 in the——

Q. Now——

A. (Interrupting.) No, these are 12 hour periods. It is less than that.

Q. It is less than the figures you gave for both of them?

A. Yes, sir.

Q. Tell me, Mr. Kramer, what was the total rise in stage, measured in inches, produced by the wave you selected as the steepest, appearing on the chart?

A. Assuming this is correct——

Q. (Interrupting.) At Lock 2.

A. I don't know that this agrees with the chart I have.

Q. If you find it is in error, will you let us know. We will do the best we can.

A. What is the question?

Q. Tell me the total rise in stage, measured in inches, produced by the steepest wave that you can find on Defendant's Exhibit 513, for identification, at Lock 2?

A. You mean the maximum rise?

Q. Yes, sir; the maximum rise, produced by any wave that you can select in that chart, measured in inches?

A. .9 of a foot.

Q. And what one are you pointing to?

A. The difference between the crest and the trough of wave 10 and 11. That is .9.

Q. You are measuring from the line marked at 10 of the trough ahead and with the wave marked 10 to the trough ahead of that wave?

A. Yes, sir.

By Mr. McCLERNAN:

Q. Can you tell us some other way to get the direction of the head?

1034 By the WITNESS. That is the crest of the wave and the trough following it, as I have drawn it on my exhibit.

Q. Do you know whether or not any of that drop was due to a change of the average stream flow?

A. I don't know. Some of the change may have been due to that.

Q. Yes, some of the change may have been due to that. How much is wave 10 above the trough ahead of it on the gauge at Lock 2?

A. 0.7 of a foot.

Q. That would be something less than 7 inches—something less than 9 inches, I mean?

A. Yes, sir.

Q. At the time this wave got to Lock 2, I understand it was 72 miles long?

A. No, sir; I didn't say that.

Q. Look at Exhibit 513, for identification, and tell me if you did not make a mistake giving the total rise in stage for wave 10, above the trough preceding it in point of time, and whether or not the total rise in stage is not 0.4 of a foot—about 0.4 of a foot?

A. The total might might be 0.5 of a foot; it is apparently more than .4 of a foot. This chart is not very accurate.

Q. Your best judgment is that it is between 0.4 and 0.5 of a foot?

A. I say at least 0.5 of a foot.

Q. Do you say that it is more?

A. I think 0.5 of a foot is about as near as I can get it.

Q. Did you find, or do you find that any of these figures are wrong, or if you do, please let us know. You testified that the storage capacity of the Billsby dam is 1,200 acre feet and Buck 200 acre feet. Where did you get that information?

1035 A. Figures in the report to the Federal Power Commission.

Q. The report of the defendant—you took it from that?

A. Yes, sir.

Q. Do you remember what period of time that report covered?

A. That report was for 1933.

Q. Are you sure that was not a report of second-feet days rather than acre-feet?

A. My recollection is that it was acre-feet.

Q. You assumed it was acre-feet, and that is how you got the figures?

A. No, my figures didn't depend on it. You mean the figures for the waves?

Q. No, sir; for the storage capacities.

A. The figures I gave was assuming that that was acre-feet.

Q. I want to ask you a further question or two about these experiments. Am I right in understanding that, when these experiments were made, in March 1930, the streambed below the dams, prior to the release of a wave, was substantially dry?

A. No, they were not.

Q. How much was there?

A. There was about 300 second-feet at Ivanhoe, which is 2½ miles below the Buck plant.

Q. There would be no more below the plant than at Ivanhoe?

A. No, sir.

Q. You said that, as to wave 4, the trough was 258 second-feet?

A. Yes, sir; there is a slight difference between my computation and the computation made under the direction of Mr. Derzulaitis for that particular wave.

Q. On your assumption that the power plant—the proposed power plant at Radford, were completely shut down, and
1036 then a large quantity of water immediately released, wouldn't the stream-bed below the dam be substantially dry?

A. No, sir; I don't think so.

Q. How much flow do you think there would be?

A. I assume a shut-down would be practically zero. As I understood, there might be some release of 100 second-feet. My computations would not be affected by that difference.

Q. I didn't ask you that. In an event, did you assume that, under your hypothesis, the stream-bed below Radford—below the Radford plant would be—the stream flow below the Radford plant would be reduced to an order of magnitude of something like 100 second-feet?

A. Yes, sir.

Q. When the wave was released?

A. Yes, sir.

Q. When you gave your evidence as to wave No. 4, didn't you testify that the trough of the wave at the Radford dam site was 1,550 second-feet?

A. (Witness refers to papers.) Yes.

Q. So that your wave 4 is a wave with a trough of 1,550 second-feet, compared with a wave under your assumed conditions having a trough at the dam site of approximately 100 second feet. Is that true?

A. Substantially; yes, sir.

Q. When these experiments were made, Locks 2, 3, 4, and 5, or dams, 2, 3, 4, and 5, on the Kanawha were in place weren't they?

A. They were still in existence and being used.

Q. And each of these dams has now been removed. Is that true?

A. I think Lock 6 is still there and I think all of them above have been removed.

Q. I referred to 2, 3, 4 and 5, and if I am wrong, you correct me.

1037 A. (No answer from witness.)

Q. Referring back to the condition of the stream-bed, is it a fact that a waive dampens out more rapidly on a substantially empty stream-bed, than where there is a substantial base flow?

A. No, I don't think so.

Q. You spoke of some flow computation by Mr. Derzulaitis, I believe it is. I understood that you had checked those?

A. Not all of them. I checked some of them.

Q. Did you satisfy yourself that your computations and Mr. Derzulaitis' were in substantial accord?

A. Yes, sir.

Q. You did not find any serious errors?

A. No, sir; if I found any, they were minor; there were minor discrepancies, as I pointed out.

Q. Mr. Kramer, this morning I showed you a copy of the report of the United States District Engineer office at Huntington with reference to these experiments and asked you whether you could say that that was a copy of the same report which you said you had considered or examined in your studies. Can you now tell me whether that is?

A. It has the same date as the report that I studied and appears to be the same report. There are a number of pages in it and it would take quite awhile to check it carefully, but, as far as I can tell, it is the same report.

Q. Referring a moment to Exhibit 142, in your direct testimony you stated that those days were selected by the defendant. Is it not a fact that within the last month the Federal Power Commission requested the Appalachian Electric Power Company to furnish the data for those specific days without inquiring whether they were typical or without disclosing the purpose for which they were desired?

1038 A. I didn't understand that to be the case.

Q. Did you see a copy of the letter requesting the information?

A. No, I did not.

By Mr. JACKSON:

Q. Mr. Kramer, I want to ask you a few questions about your chart which you have introduced as Exhibit 132. Am I right in understanding that you assumed an average flow of 2,000 second-feet for one day and utilized that average flow on a peak basis in developing the diagram shown on Exhibit 132?

A. Yes.

Q. That is, you start out in the lower figures on the chart with an assumed average flow of 2,000 second-feet for 24 hours at the power plant or out of the power plant?

A. Yes.

Q. And peak that?

A. Yes.

Q. And then this same 2,000 second feet is still being peaked in the second diagram from the bottom on top of a base flow which has entered the stream below?

A. Yes.

Q. And again on the third and fourth diagrams this same 2,000 second-feet is still being peaked on top of certain base flows which you have assumed to be augmented to the extent shown on your chart?

A. Yes.

Q. As I understand it, this was a hypothetical process and you could have used 3,000 average flow or 4,000 for purposes of illustrating the peaking of the quantity and you merely assumed the 2,000 second-feet?

A. There is nothing about that that is supposed to be very accurate. It is just to give a picture of the way a wave might pass down the stream in order to show what the amplitude
1039 of the wave is, what the amplitude of the crest is and what the amplitude of the trough is and what the period is.

Q. I merely want to get at the basis of it and to understand it. With a 2,000 second-feet flow for a day which you had peaked—it might have been any other figure, but you did choose 2,000 second-feet?

A. Yes.

Q. Will you look at the wave in the lower diagram on your chart, Exhibit 132, and tell me how many second-feet days there are in each of those waves?

A. Supposed to be 4,800. No, 2,000 second-feet days in the lower one.

Q. Will you look at the lower one a little more closely and see whether or not your wave does not contain 2,370 second-feet days?

A. I had a flow of 9,000 second-feet there for six and one-third hours. I think probably that period should have been 5⅔ instead of 6⅓. I have a period there for the crest of 6⅓ hours and it should have been 5⅔.

Q. 5⅓ it would be, wouldn't it?

A. 5⅓. That is right.

Q. But you have actually shown in your two waves on the bottom diagram of Exhibit 132 a volume of water which would be in excess of the total amount of water for 24 hours at 2,000 second-feet flow, haven't you?

A. Yes.

Q. And if you were going to make your average flow line conform on the diagrams on the bottom of the chart with the actual

size of your waves, you would have to raise the average flow line, wouldn't you?

A. No, I would just shorten the period from 6⅓ hours to 5⅓ hours and the picture would almost remain the same as it is now.

1040 Q. Then you would be reducing your wave to conform with the 2,000 second-feet flow?

A. That is right.

Q. But if you wanted to conform the average flow line with the size of the wave you have actually shown on the bottom of your chart, you would have to raise this average flow line, wouldn't you?

A. Well, that wouldn't be the way to change it. It would be nearer like the picture there—just shorten this line about an eighth of an inch or something like that.

Q. Would you then decrease the size?

A. Decrease the period, decrease the period of the crest and increase the period of the trough about one hour, I guess.

Q. And by about 20 percent?

A. No.

Q. You would increase a duration of 5⅓ hours by one hour?

A. Yes.

Q. Which would be nearly 20 percent?

A. Yes.

Q. Isn't it a fact that on the second diagram from the bottom of your Exhibit 132 you show again a wave which has a volume equivalent to 9,000 second-feet flowing for 6⅓ hours?

A. That is correct. That same correction would apply to all three of them.

Q. If you corrected that you would increase the amount of water which would be in these green areas?

A. No; I don't think so. It would just increase the top horizontal section.

Q. It would increase what?

A. Decrease the top section of the wave across the top.

Q. That is, it would make it narrower?

1041 A. One of those spaces narrower.

Q. And when you come down, you will notice, Mr. Kramer, that to the righthand of those waves on the diagram second from the bottom as you face the chart, there is an area following the wave—I undertsand that is following, isn't it?

A. Yes, that is right.

Q. Colored dark geen; is that right?

A. Yes.

Q. That represents water in the wave that has begun to dampen out?

A. Yes.

Q. And if you decrease the width of your wave, you would at the same time move the lefthand boundary of that green area representing the water which has dampened out of the wave?

A. Yes; move it to the left one space and leave it about the same area but move it to the left one space.

Q. If you moved it to the left one space, it would increase the area, wouldn't it?

A. It would leave the blank space in the middle one space longer.

Q. What space in the middle?

A. The blank space showing the amplitude of the trough. The amplitude of the trough would be one hour more and the amplitude of the crest would be one hour less.

By Mr. McCLERNAN:

Q. You mean period?

A. Yes, period.

By Mr. JACKSON:

Q. Direct your attention for a moment to the third diagram from the bottom of your chart, Exhibit 132. If that, in fact, represented a wave corresponding to the peaking of 2,000 second-feet flow per day, as it does not, you would again narrow the
1042 width of that wave, the square part of that wave, in the diagram, wouldn't you?

A. Yes, one space.

Q. So that would result in moving the line at the back of the wave which bounds, on the upper part, the red area and in the lower part marked by the division between the dark green and light green areas, one space to the left on the chart as you face it?

A. It would be one space more between the two red areas.

Q. That is right, and that line that not only bounds the red area but divides the two green areas would be moved one space to the left, wouldn't it?

A. Yes.

Q. And the result of that would be that the dark green area would be larger, wouldn't it?

A. Well, it is a diagrammatic affair. The picture would probably be just the same as it is now.

Q. It wouldn't make any difference to you then whether you were peaking the wave on one volume or another?

A. It would if I were attempting to show an accurate condition at some particular place, but just to show what the amplitude and the trough and the back slope of a wave, that doesn't represent a wave at any particular point. It is just intended as a diagram to show what the amplitude, the crest, the trough, and the period of the waves are. It is not intended to show any particular wave.

Q. I understand that, of course, but if you had put in the actual amount of water used, 2,370 second-feet, it would somewhat raise that average flow line, wouldn't it, in the diagram if you were putting that on diagrammatically?

A. If I had changed it that way, it would, yes.

Q. And that would result in a change in your measure-
1043 ments from that line of amplitude, wouldn't it, as measured from that line on the diagram?

A. Yes.

Q. I understand this is only diagrammatic, but I want to make an inquiry because I was a little misled by something about it. I direct your attention again to the third diagram from the bottom of that chart. Am I right in understanding that if that diagram were made accurately the red area should be equal to the sum of the dark green area following the wave and the dark green area on the face of the wave?

A. I would say that the green area should be larger than the red area for the reason that the water doesn't travel quite as fast in back of the wave.

Q. The point I am getting at is that the red area is intended to indicate the area of the wave as it originated?

A. Yes.

Q. Which at the point shown by the third diagram on Exhibit 132 has disappeared or dampened out into the water that has gone ahead, if that is the right way, on the face of the wave and fallen behind at the back of the wave; is that right?

A. It is more of a change of the cross-section of the moving wave than it is of a change in the water, the position of the water. The wave moves faster than the water.

Q. Moves faster than what water?

A. Than the water in the stream, than the average velocity of the water in the stream.

Q. I understand that, but I am talking now only about the wave which you show on top of your base flow. You understand that, don't you?

1044 A. Yes.

Q. And I am asking you whether you have not sought to show diagrammatically that the area of the wave colored red in the third diagram—the water that was in that area—has now, as a result of the change in the shape of the wave, taken its place in the dark green areas immediately preceding and following the light green section of the wave?

A. Not with any accuracy.

Q. I didn't intend any accuracy, but that is the purpose of the coloring?

A. You mean that the green area is supposed to be equal to the red area?

Q. I haven't asked you that yet. As you testified on direct, the red part of the diagram, the third diagram from the bottom of the sheet, was intended to show the area of the wave as it started at the bottom which at this point had been dampened out into the area which precedes and follows the light green section of the wave as you show its shape in the third diagram; is that right?

A. Yes.

Q. Now, if one wanted to be accurate in giving a diagrammatic representation of this wave action and this wave form, the red area shown in that wave would have to be equal to the sum of the dark green area preceding the light green area on the face of the wave and the dark green area following the light green area at the tail of the wave?

A. It should exceed it.

Q. Can you not say from an inspection, as you have had the diagram prepared, the red area is, in fact, over twice as great as the sum of the two dark green areas?

A. I wouldn't say that without actually measuring the areas.

Q. You can see it is a great deal larger?

1045 A. Sometimes a diagram of that kind is deceiving unless you actually measure the areas; however, I will say that there was no attempt to prepare that diagram with that accuracy. It was more for the purpose of showing that the back slope of the wave is flat and the front slope steep, and that the water is dragged out of the crest towards the back of the wave. Nothing further was intended than that, and to show the definitions contained on there.

Q. I am not raising any question as to what you were trying to show. I am trying to find out whether or not it can be readily and fairly interpreted. You would not be willing to testify that the red area is not more than twice as great as the two dark green areas on that diagram, would you?

A. It is not more than twice as great?

Q. Yes, as the sum of the two dark green areas?

A. I would say it was nearly equal to the sum of the two dark green areas.

Q. That is your best judgment as an engineer?

A. Yes, my best judgment by looking at it.

Q. We have measured that and you might be surprised to know it is over twice as great. Now, referring to the top diagram on Exhibit 132, as I understand it, you there show a situation where the two waves have caught up with each other. Would that be the right way to say it?

A. No; the crest of the waves are about the same distance apart as they were to start with.

Q. I mean by that the front of the following wave has caught up with the tail, as it were, of the first wave; is that right?

A. That is correct. The water has lagged from the crest of the preceding wave back until the crest of the wave back of it has caught up with it.

1046 Q. The steep part of the following wave travels more rapidly than the shallower part of the tail of the preceding wave; is that so?

A. The water does, yes; in the wave.

Q. And that results in the following wave catching up with the back or end of the preceding one?

A. I would rather express it the other way and say that the water in the tail of the preceding wave lags back.

Q. I' any event, they come together?

A. Yes.

Q. Mr. Kramer, on this diagram you have assumed a condition where you have no flow and instantaneous release of 9,000 second-feet continuing at that uniform rate for either 5⅓ or 6⅓ hours, depending on how you correct your chart, and then being abruptly terminated to nothing; is that right?

A. That is right.

Q. Does that ever happen?

A. Ordinarily the increase in flow would be over a longer period. There would be undulations in the top of the wave and the end of the wave would not be cut off as abruptly. It would be cut off less abruptly. It wouldn't be regular like that.

Q. Assume that you are going to release this volume of water, Mr. Kramer, and that you started out and gradually increased from nothing until 9,000 second-feet over a period of, say, two or three hours, remained at 9,000 second-feet for half an hour or an hour and then you cut down to 3,000 second-feet gradually for two or three hours and then after an hour increased for two or three hours up to, say, five or six thousand second-feet, and then drop off to zero gradually, would the form of the resulting wave look anything like these square boxes on the bottom of diagram 132?

A. It would look something like them, not identical by any means.

1047 Q. They would be very different, wouldn't they?

A. The outline would be regular. There would be a sloping face upstream.

Q. They would be spread out in a gradual line, wouldn't they, a gradually undulating curve?

A. More of a gradual curve than this is; yes.

Q. You testified that you had some estimate that under certain conditions a wave released at Radford would persist to the extent of 75 percent to the mouth of the Kanawha River and, I believe, 85 percent to Kanawha Falls. Will you tell me whether those figures were derived by computations or whether they are based upon your judgment?

A. They are based upon my judgment.

Q. You also testified that from your study of these exhibits 133 to 141, inclusive, you had made some estimate of the percentage of the waves which persisted at Kanawha Falls, did you not?

A. Yes; I think so.

Q. That is the percentage of the amplitude at the Radford dam site "A" which persisted at Kanawha Falls?

A. That is correct.

Q. And at Glen Lyn?

A. I didn't say that I had at Glen Lyn.

Q. There were two places. One was Lock No. 2 and the other Kanawha Falls?

A. No.

Q. Can you give me these two figures from your notes? Do you know the two places about which you testified?

A. Lock No. 2 and Ivanhoe and Kanawha Falls, I think, were the figures that I read.

Q. Didn't you give figures for two places in percentages of the amplitude which you found at Radford dam site A?

1048 A. I only remember giving the one for Kanawha Falls.

Q. What percentage figure did you give for Kanawha Falls?

A. Wave No. 4 I think I was reading about. The amplitude of the wave was 44 percent of the amplitude at Ivanhoe.

Q. Did you give a figure of 54 percent?

A. I gave a figure of 53 percent of the amplitude of the wave at Radford. The wave at Kanawha Falls was 53 percent of the amplitude of the wave at Radford, the same wave.

Q. Wave 4?

A. Yes.

Q. As I read your testimony at page 2103 of the record, Mr. Kramer, you say that the amplitude of the wave for Lock 2 applying to Radford is 54 percent?

A. I may have read Lock 2. I am reading the wrong figure. May I read those figures again?

Q. Yes; you can read the figures if you want to. Tell what it is.

A. The amplitude of wave No. 4 at Kanawha Falls is 45 percent of the amplitude of the same wave at Ivanhoe.

Q. I don't think you mentioned Kanawha Falls at all yesterday in your transcript. It is only at Lock 2?

A. At Lock No. 2 it was 35 percent of the amplitude of the wave at Ivanhoe.

Q. And what did you say was the amplitude of the wave at Lock 2 in terms of Radford dam site A?

A. 42 percent.

Q. If the record on page 2103 shows 54 percent, that is an error, is it?

A. The 54 percent applies to the Kanawha Falls. The wave at Kanawha Falls was 54 percent of the wave at Ivanhoe.

1049 Q. The one for Lock 2 is 42 percent according to your computations?

A. That is right.

Q. I suggest that you read page 2103 of the record and get that straightened out. There appears to be an error there. It appears to read that the amplitude of the wave, according to your estimate, at Lock 2 was 54 percent of what you found it to be at Dam Site A and that was the way I understood your testimony yesterday. Will you give the amplitude of the wave at Kanawha Falls as you determined it to be?

A. The amplitude of wave No. 4 at Kanawah Falls was 45 percent of the amplitude of the same wave at Ivanhoe.

Q. I am asking you not for percentages but what you found the amplitude of the wave at Kanawha Falls, wave 4, to be in second feet?

A. 2,650 second-feet.

XQ. Mr. Kramer, I understood you to testify yesterday that in your opinion the greater the period of the wave the greater the persistence of the wave down stream.

A. The longer the period.

XQ. I understood the longer the duration of the wave the longer would be its persistence down stream?

A. Yes, sir; other things being equal.

XQ. And then I understood you to say the longer the period or duration of the trough the longer the wave would persist downstream?

A. The longer the effect of the trough would persist.

XQ. Of course operating on a daily cycle of twenty-four hours those two principles meet themselves coming back, so far as daily cycle is concerned?

XQ. Do you understand the question?

A. No; I don't.

X Q. Well, when you are operating a wave on a cycle of twenty-four hours, do not those two principles work in opposite
1050 directions; that is to say, every time that you lengthen the duration of the wave you necessarily shorten the duration or periodicity of the trough, do you not?

A. Yes, sir.

1050a Re-direct examination by Mr. McCLERNAN:

Q. Mr. Kramer, I believe counsel asked you on cross-examination whether it was your understanding that the plans for the construction of this dam at Radford had been approved by the Chief of Engineers. Was it your understanding that approval was unconditional?

A. It was my understanding there were conditions attached to it.

Q. Were any of those conditions the operation of the project under a license?

By Mr. JACKSON. If he knows.

Q. If you know?

A. I don't remember the conditions very accurately. I remember there were conditions. I would have to make an assumption to answer the question.

Q. I think counsel also asked you whether the Federal Power Commission had made a request in the last month for a certain load data. Did the company furnish that load data which was requested?

A. I know of no request during the last month. This data I saw has been filed at the Federal Power Commission for sometime, since around the first of the year, I would say the first of January; however, I am not sure of that. The reason I think that, the last month included in it was October, 1935. If they had furnished it after the end of 1935 I assume they would have included the other two months.

By Mr. JACKSON. Not if they asked for specific dates?

A. No, sir.

Q. So far as you know, the last request counsel mentioned was not complied with by the company?

A. It was not. I know I saw these reports about the first of May in the files of the Commission.

By Mr. JACKSON. Will you read the answer. (Last answer read.)

A. I didn't intend to say it did not. I don't know anything about that.

Q. You don't know about that?

A. No, sir.

Q. I believe also counsel asked you if it was not possible, physically possible, to use varying quantities of water, less than 9000 second-feet, in the operation of the Radford dam, constructed as proposed, would that be an economical use?

A. It might be.

Q. In what way?

A. Why by operating the plant on peak loads.

Q. I don't think you understand me. My recollection of the cross-examination was to the effect there might be a continuing use of different quantities of water, substantially less than 9000 second feet, in the operation of the Radford plant. My question to you now is, whether that is the most efficient or economical use at the Radford project or operation?

A. You mean at a uniform load?

By Mr. JACKSON. I object to that, because not in accord with the testimony on cross. It makes an erroneous assumption, I did not put the form of question you are now putting to the witness.

By Mr. MCCLERNAN. I believe it is true the form is not the same.

By Mr. JACKSON. Neither are the facts or assumptions.

By the COURT. What I understand you are asking the witness is: This witness has testified the plant might be operated, and the use and flow of water considerably less than 9,000 feet; varying downward, say 7,000, 6,000, 5,000 or 4,000. You want to know if it would be economical to operate the plant in that manner?

By Mr. MCCLERNAN. Yes, sir.

By the COURT. He means a plant adapted to economical, advantageous use, at figures of flow less than 9,000 cubic feet?

A. Not unless it is operated as a peak plant, at a varying load.

Q. My recollection on this is not clear, but I believe something was said about the fact that these waves and their effect in fluctuating streams below would be serious only in times of low flow in streams, is that true?

A. The waves would be——(Interrupted.)

By Mr. JACKSON. I object to the form of the question, so far as it calls on the witness to state if the effect would be serious. I think that is a conclusion he ought not to draw. If he wants to ask what effects would exist at varying flows I have no objection.

By Mr. MCCLERNAN. I will substitute "substantial" instead of "serious."

By the COURT. Go ahead.

By Mr. JACKSON. Exception.

A. The waves would persist downstream, if the plant was operating on a varying load, whether the water was low or at some medium stage. There would be less reason for varying the load when there was a high-stream flow because the plant would want

to develop all the kilowatts they could, and at a flow of 9,000 feet per second the most economical way to run the plant would be to run it with the 9,000 second feet all the time, as long as that water was there, assuming the reservoir to be full.

By the COURT. Is that what you were getting at?

By Mr. MCCLERNAN. No, sir; but I will bring it out later.

Q. I believe you testified also that the Radford plant could be used to carry what counsel has termed the sub-peak load. Now I will ask you if a dam can be used as economically for carrying that kind of load as for carrying the real peak load?

A. Not in times of low flow, not in the neighborhood of 2,000 second-feet.

Q. I think you said also that the London and Marmet plants and the Buck and Byllesby plants have actually been used to some extent to carry peak loads?

A. Yes, sir.

Q. Can those plants be used as advantageously for that purpose as the Radford plant could be?

A. Not to carry peak loads, on the lower load. The stream flow is almost as much at Buck and Byllesby as at Radford. It is greater at Radford, but the storage at Buck and Byllesby is much smaller in proportion to the stream flow at the point they are located than the storage is to the stream flow at Radford. Radford having 100,000 acre feet capacity and Buck and Byllesby plants having only, as I recollect, 1,400 acre-feet capacity together.

Q. How about the London and Marmet?

A. The same thing is true at London. The average flow of the Kanawha River at London is very much greater than the average flow of the New River at Radford. The flow available for 60% of the time at London is much greater than the flow available for 60% of the time in Radford; however, the storage they are allowed to draw-down in London is in the neighborhood of 2,500 acre-feet, whereas the storage they can draw-down at Radford is 100,000 acre-feet.

Q. You know whether there is any reservoir on the New and Kanawha Rivers at present used only for flood control purposes?

A. I know that there is none.

Q. I think you were questioned concerning your testimony about the hydro installation of the Appalachian Electric Power Company, and what you have told me on direct examination, that it came to some 74,000 kilowatts; is that correct?

A. I think I stated that using 9,000 second-feet flow, the capacity would be 70,000 kilowatts.

Q. I am talking about the total hydro installation, not the Radford project?

A. Yes, the total hydro installation for the Appalachian Electric Power Company, about 74,000 kilowatts.

Q. In giving that figure, you did not include, as I understand you, the power potentially available at the Winfield Dam?

A. I did not.

Q. Was that because the Winfield dam is not completed?

A. Yes, sir; it is not completed.

Q. And so far as you know it may never be completed?

A. So far as I know for certain it may never be completed.

Q. You know of at least one other large power project that is well along toward completion, but which may not be completed?

A. That is correct.

Q. On cross-examination, counsel undertook to have you correct some figures you had given, concerning the persistence of these Buck and Byllesby waves, and I think those corrections were satisfactorily made, but I believe you made another error in correcting them. I think you said wave #4 at Kanawha Falls was 54% of that wave at Ivanhoe. Did you intend that, or did you intend 54% of the wave at Radford dam site?

A. The amplitude of the wave at Kanawha Falls was 45% of the amplitude of the wave at Ivanhoe and 54% of the wave at Radford.

Q. Mr. Kramer I understand that at Mr. Jackson's request you have produced a blue print which you all discussed?

A. I have.

By Mr. McCLERNAN. I don't remember the occasion for calling for the production of this blue print.

By Mr. JACKSON. Is that the stage chart I asked you about?

A. This is the stage chart he asked me to produce.

By Mr. JACKSON. I asked Mr. Kramer some questions about a stage chart marked Defendant's Exhibit #513 for identification, and as I understand Mr. Kramer is producing his own stage chart corresponding to Defendant's Exhibit #513 for identification.

Q. Is that the situation?

A. Yes, sir.

By the COURT. One chart Mr. Kramer was examined about he said it was difficult to make estimates of figures, and he stated he had another chart, is that the one?

A. That is correct.

By Mr. McCLERNAN. Let the record show at the request of counsel for defense Mr. Kramer has produced Government's Exhibit #143, which is entitled on its face, "New-Kanawha Rivers power waves period of March 11 to April 3, 1930, inclusive", and that I now offer it in evidence. Any objection?

By Mr. JACKSON. I have no objection to your statement. I didn't ask him to produce it. I asked for the data and if he was dissatisfied with it to check it with his chart.

(Note: Chart marked and filed Government's Exhibit #143.)

Q. Will you refer to that Exhibit #143 a moment?

A. Yes sir.

Q. Can you tell us briefly the difference, if any there is, between this Exhibit #143 and the similar blue print which counsel produced and asked you to use on your cross examination?

By Mr. JACKSON. That was Defendant's Exhibit #513 for identification. My question was directed only to the gage readings at Lock #2, so that is the only difference as I understand it.

A. What wave was I referring to?

By Mr. JACKSON. You referred first to your wave #4, the first wave I referred to and which I asked you to state the rate of rise per hour, expressed in feet, as shown by the gage, at the upper gage of Lock #2.

A. As I recollect it I was asked the rate of fall.

By Mr. JACKSON. No; you were asked the rate of rise.

A. The rate of rise for wave #4 as shown on Defendant's Exhibit #513, which I, however, don't think was what was asked me the other time——

By Mr. JACKSON. Yes, it is.

A. (Continuing.) occurred during a period of about three hours. The rate of fall was what I testified to.

By Mr. JACKSON. You misunderstood. If I may I will make it clear. I asked you to state the rate of rise for your wave #4 in inches per hour on the gage as shown on the upper gage at Lock #3.

A. As shown by your exhibit?

By Mr. JACKSON. That is all we had.

By Mr. MCCLERNAN. I would still like to have the question I asked answered.

By the COURT. Mr. McClernan had this witness on redirect, but the reason I was letting you go on, I thought you were bringing him onto the blue print to answer the question.

By Mr. JACKSON. I was trying to be helpful. I apologize for doing it.

Q. I want to know in what way the exhibit this witness produced differs from the exhibit produced by the defense?

A. I don't know it does differ with reference to accuracy. This exhibit I have shows the time in hours and the vertical scale shows the rise in tenths of the foot, whereas Defendant's Exhibit #513 has no intervals for less than one foot in a vertical direction or ½ day in the horizontal direction.

Q. Does the exhibit you have produced, Government's Exhibit #143 cover the same dates and the same places as the Defendant's Exhibit marked for identification #513?

A. It does, yes.

Q. I think in connection with a certain wave which appears on Defendant's Exhibit #513 as on the 23rd of March, you gave the total difference in stage, at first I believe you said that the difference in stage was nine-tenths of a foot, and later in some connection with that same wave, you stated the difference in stage was about five-tenths of a foot. Was that last statement a correction or were you talking about a comparison at different points?

A. Comparison at different points. In the first case I was comparing the crest of the wave with the following trough. The difference in gage there is nine-tenths of a foot, as I described it. If that difference is compared with the preceding trough it is five-tenths of a foot, slightly less than five-tenths of a foot.

By Mr. JACKSON. Will you kindly have him identify the wave?

Q. That wave you have been talking about, as I understand it, appears on Defendant's Exhibit #513 as on the 23rd of March, with the troughs at the left and right of it, and appears on the same date on your Exhibit #143?

A. Yes, sir.

By Mr. JACKSON. That is at Lock #2?

A. Yes, sir.

Q. Now this wave that is shown on these two exhibits we have been discussing, was that a wave of the size or intensity such as could be generated by the Radford project?

A. I will have to refer to this exhibit we were using. Will you give me the date?

Q. You mean the date of the wave you discussed?

A. It isn't necessary. That shows on the other exhibit as wave #10, and I can identify it on this exhibit as wave #10. Wave #10 had an amplitude of from 500 cubic feet per second to 11,100 cubic feet per second, the difference between the two being about 10,600 cubic feet per second.

By Mr. JACKSON. That is wave #10?

A. Yes, sir.

By Mr. JACKSON. And where is it?

A. At Ivanhoe, and shown on Exhibit #140 under date of March 21, at Ivanhoe. It will be observed the peak of this wave, that is the time the largest flow was let out, was only for a few minutes. The time the flow of 9,000 second-feet occurred was slightly less than three hours. The time the water was shut off, or the water was not shut off, preceding the wave, but the time

the flow was less than 600 second feet preceding the wave, was slightly less than five hours. At the time the flow was less than 700 second-feet, following the wave, slightly less than seven hours. This differs from the waves that might be created at the Radford plant if operated as I have discussed here by ordinary peaking throughout the week, or shutting the flow down Friday night and letting it out Monday morning, first in respect to the short time the water is shut off between peaks in the waves shown on the chart, and created at the Buck and Byllesby plants, as compared to the time the water could be shut off at the Radford plant.

Furthermore, the time that the large flow would be let out at the Radford plant, at least flows exceeding 8,000 cubic feet per second, would be in the neighborhood of nine to ten hours, instead of less than three hours, as I described there.

There is one other point. These waves were created at Buck and Byllesby plants. They were measured as Ivanhoe, forty-six miles up-stream from the proposed Radford plant.

Re-cross examination by Mr. JACKSON:

Q. Isn't it a fact that I asked you to give me the rate of change and the maximum change in stage of what you thought was the steepest and largest wave shown on Exhibit #513 of the Defendant, marked for identification, at Lock #2, and that you yourself selected wave #10 as the one for which you desired to give those figures?

A. The waves are very similar. This appeared as steep as any of them, possibly steeper than most of them.

Q. And at my request you made that selection?

A. I did.

Q. It was not one I picked out?

A. That is correct.

Q. And there are other waves on there whose duration of release at Ivanhoe was longer than the duration of release at wave #10?

A. That is correct, but the variation was not as much.

Q. Under your normal procedure do you measure the amplitude of the wave from the trough which precedes the crest or the trough which follows the crest, in point of time?

A. I think it can be done either way. If there is no change in stage in stream flow and the cycles are the same, the variations in stream flow are the same. You would get the same results. If there is a difference in the waves as they are created, and there is a change in stream flow, you would get different results.

Q. What is the normal engineering practice in measuring the waves?

A. There is no normal practice in so far as I know. The waves as I showed them on my chart, I was discussing awhile ago, I was comparing the trough that followed the wave with the preceding crest. I think if I were working independently I would adopt that method, however, the waves as reported by the Huntington office were described in the opposite manner, so I followed that in order to have somewhat the same figures in order to compare my figures with theirs.

Q. Is it fair to say the engineering practice permits either method?

A. That is correct.

Q. What is the engineering practice with a varying base flow as to which way the measurements may be made?

A. I think the most accurate way would be to take the average rise between the two troughs, the one preceding and the one following, and measure the amplitude of the crest from that.

Q. If that average was applied to this wave #10 for which you gave two amounts, nine-tenths of a foot, and somewhere between four and five-tenths would that result in averaging those figures?

A. Yes, sir; it would.

Q. You think that would be the fairest way of arriving at that measurement?

A. I think the preceding wave and the following wave, if they were the same that would be the most correct. A few other things though should be taken into consideration in the complete study of that wave; however, if it was just to determine this one point, the best way would be to average those two figures.

1051 EARLE E. TEETER

Direct examination by Mr. GATCHELL:

Q. Mr. Teeter, will you state your full name and occupation?

A. Earle E. Teeter, Huntington, West Virginia; occupation, Civil Engineer.

Q. And where do you work?

A. In Huntington, U. S. Engineer Office.

Q. And who is your immediate superior?

A. My immediate superior is W. S. Winn.

Q. How long have you been in the Huntington office?

A. Since June, 1928.

Q. And where were you prior to that time?

A. I was on the Tennessee River, and I was located at Chattanooga, Tenn.

Q. With the United States Engineers?

A. Yes, sir.

Q. Are you familiar with the records of the United States Engineers Office at Huntington, West Virginia?

A. Yes, sir.

Q. I show you Government Exhibit No. 144, being a series of maps entitled "Kanawha River Lock and Dam, Nos. 2, 3, 4, 5, 6, 7, 8, 9, 10, and 11," and will ask you if those are records or maps obtained from the United States Engineers Office at Huntington?

A. They are official records.

Q. And what do those maps purport to show?

A. They show maps of Locks and Dams 2, to 11, on Kanawha River.

Q. And does it show on each map, at any place, the year of completion?

1052 A. The year of completion is given in the upper right hand corner of each map, for each lock and dam.

(Filed before as Exhibit Government 144.)

Q. Does your office have charge also of the Ohio River immediately above and below the mouth of Kanawha River?

A. Yes, sir.

Q. Can you tell me the dates of completion of Locks and Dams 26, 27 and 28 in Ohio River?

A. Yes, sir, I have those notes from the official records.

Lock and Dam #26 was completed in 1912.

Lock and Dam #27 was completed in 1923.

Lock and Dam #28 was completed in 1915.

Q. Can you give me the distances between those locks or the distance below the mouth of Kanawha River for those three dams?

A. Lock and Dam #26 is 13 miles below the center of the mouth of Kanawha River.

Dam #27 is 35.3 miles below the Kanawha River, or 22.3 miles from Lock #26.

Lock and Dam #28 is 45.9 miles below Kanawha River, or 10.6 miles below #27.

By Court:

Q. Where is Lock #28 with reference to the City of Huntington?

A. It is in the lower part of Huntington, and two miles below Huntington Bridge.

By Mr. GATCHELL: Q. Can you give me the distances on the Kanawha River of the Locks shown in Exhibit 144, being maps of Locks and Dams 2, to 11, inclusive?

By Mr. GATCHELL: Q. Distances from where?

By Mr. GATCHELL: Q. State from what point you start the distance?

1053 A. I will start at the mouth of Kanawha River.

Lock #11 is 1.8 miles from the mouth.

Lock #10 is 19.2 miles.

Lock #9 is 25.4 miles.

The next is Winfield site, which is 31.1 miles.

Lock #8 is 36.2 miles from the mouth.

Lock #7 is 44.2 miles from the mouth.

Lock #6 is 54.3 miles from the mouth.

Lock #5 is 67.6 miles from the mouth.

And the New Marmet Dam is just above, 67.8 miles.

Lock #4 is 73.5 miles from the mouth.

Lock #3 is 79.7 miles from the mouth.

Then comes the New London Dam 82.8 miles from the mouth.

The last one at the river is Lock #2, 84.8 miles.

Q. I show you Government Exhibit 144, being a map of Lock and Dam #2 on the Kanawha River showing that the date of completion for that lock was 1887, and will ask you if that dam has remained at the same level that it was originally constructed?

A. No, sir; the dam is timbered crib filled, with stone. About 1925 a settlement was noticeable and by 1930 it was reported by the Charleston office, which office had charge of the operation of this river, that the crest of the dam had settled 1.1 feet lower than the original elevation.

Q. I notice on that map that the upper pool elevation is given as 597.75. Is that the correct elevation?

A. That is the elevation on the original Kanawha River Datum, which is different from the Ohio River datum.

Q. Has the Kanawha River been resurveyed to establish the correct datum?

A. The Kanawha River was resurveyed in 1930 and the old Kanawha River datum was changed to the Ohio River

1054 Datum or Sandy Hook datum, and the elevation of points recorded on the map from the new datum.

Q. How much should be added to the datum shown on these maps to get the correct Ohio datum?

A. 4.15 feet.

Q. Do you mean to add 4.15 to the elevation shown on this map and that then they will correspond with the elevation shown on the Ohio River datum?

A. That is correct. It did not change the actual elevation at any point, it just changed the recorded elevations.

Q. I show you Government Exhibit No. 110, entitled "Ohio River at Lock and Dam 24, during the months of August, 1918,

through to October, 1933," it not being a continuous record but picking up particular months. Will you examine Exhibit 110, and tell me if those are the official records of the United States Engineers Office at Huntington, West Virginia?

A. All these sheets are original copies of records in the Huntington office.

Q. I notice that most of them are signed by the Lock Masters but that some of them are signed by Roland R. Castle, Assistant Engineer. Were those records obtained in the same manner as the records signed by the Lock Masters?

A. They were. Mr. Castle was in charge of the District or the lower portion of Ohio, and he signed a few of these instead of the Lock Masters.

Q. I notice also that on these signed by the Lock Masters appears the "receipt stamp, United States Engineers Office," when received, and the date, but that on these signed by the Assistant Engineer, no such receipt stamp appears. Can you explain why no receipt stamp is shown on these?

1055 A. That is merely the date received by the Huntington Office. It has nothing to do with the official status of the exhibit. I will explain it this way, Mr. Castle signed probably several sheets at once, and when the mail came to the office, they probably stamped the top sheet and passed it on, and did not go through the whole pile and stamp all of them. That would be my explanation of it.

Q. How are these records obtained in order to be placed on these sheets?

A. They are copied from the Lock Masters Log Books of the Gauge readings.

Q. Are they checked before being transmitted to the Huntington office?

A. Yes; they are checked at the Lock or at the District Office.

Q. I notice on a number of pages, particularly on the third page which covers the period October 1920, at Dam #24, the 8 a. m. readings are placed on this chart by a typewriter for the upper and lower pools, but that the middle gauge is placed on there in pencil, with the exception of three days. Can you explain the pencil figures?

A. When the dams are up two gauges are read, the upper gauge and the lower gauge. For these three days they have one reading. As to the middle gauge, that is read when the dams are down, the middle gauge is what we call the low-water gauge, and these pencil gauge figures here refer to this middle gauge?

Q. You say these pencil gauge figures here refer to this middle gauge, and would give the stage of the river above low water. In case the dam were down and in case the other two gauges

were not read, and were the pencil figures placed on these charts by the lock master?

1056 A. No, sir; I would say they were placed on there in the Huntington office, because the typewritten portion of the report is from the Lock or District Office, which is the same thing.

I might add that these gauge records are used for various purposes and studies, certain hydraulic studies, and if you wanted to know the elevation of the flow above low water, someone has just inserted these pencil notes for ready reference.

Q. I notice at the bottom of pages appears zero of upper gauge (above sea level). The part of the chart to which I am now directing your attention is for the month of October 1920, and shows zero of the upper gauge 520.1. Can you tell me how you obtain the elevation of the water with the use of that zero of upper gauge?

A. The gauge reading added to the zero of gauge will give the elevation of the water.

Q. So that I would take the reading from the upper pool and add it to the zero of the upper gauge, and obtain the elevation of the water in the upper pool?

A. Yes, sir.

Q. Would I do the same thing to the lower pool?

A. Yes, sir; it would give you the elevation of the pool below the dam.

Q. I now show you Government Exhibit 111, being a series of charts for Dam #25, for several months, beginning August 1918 and ending with the month of October 1933 the months, however, not being consecutive. May I ask you if those are records from the Huntington office?

A. Yes; they are official records of the Huntington office.

Q. Can you tell from that what was happening to Dam #25 in August 1918?

A. There is only one reading and it means the dam wasn't up, and I see the notes here refer to construction of dam. The dam was not complete.

1057 By the COURT:

Q. You say the dam was up?

A. Was not up.

Q. When a dam is up, what does that mean?

A. It means the dam is in a position to hold the water back during which time two gauge readings are taken, upper and the lower.

Q. How are you going to apply that term to the Roller type dam?

A. The dam will be in position on the Roller type dam.

Q. That is one thing that sounded rather funny to me, the expression that the dam is up?

A. There will be two gauge readings just the same.

By Mr. GATCHELL:

Q. Then beginning with the fifth page of this Exhibit 111, appears a series of two readings for Dam #25. Will that show whether the dam was completed, or not?

A. The two readings mean the dam was up in position, the wickets were up when they read both the upper and lower gauges.

Q. When was dam #25 completed?

A. Dam #25 was completed in 1922.

Q. Have you given us heretofore the date of the completion of Dam #24?

A. No, sir; I just gave #26, #27, and #28.

Q. Will you give us the date of the completion of Dam #24?

A. Dam #24 was completed in 1919. Dam #25 was completed in 1922.

Q. There appears on these charts table, as in the previous tables in Exhibit 110, pencil figures for the middle gauge. Were those figures placed on there by the Lock Master?

A. No, sir; the same as the other exhibits, they were placed on there in the Huntington Office.

1058 Q. I show you Government Exhibit 112, being gauge readings at Locks Nos. 2, 3, and 4, Kanawha River, and Locks Nos. 26, 27 and 28, Ohio River, during Low Water periods of 1921, 1925, 1930 and 1932, and will ask you if those records were prepared in your office?

A. Yes, sir.

Q. Were they prepared by you or under your supervision?

A. Yes, sir.

Q. Can you tell me where you obtained the figures under the column head "Kanawha Falls, C. F. S."?

A. That is cubic feet per second, daily discharge obtained from the water Supply Papers, U. S. Geological Survey.

Q. Can you tell me what Water Supply Paper you refer to for 1921?

A. Water Supply Paper 728 at page 99.

Q. Can you tell me what Water Supply Paper you consulted for the figures, discharge Kanawha Falls, for 1925?

A. The same Water Supply Papers, 728, page 100.

Q. And for 1930?

A. The same paper at Page 66.

Q. Please look at that and state whether it is the same paper?

A. For 1930, it should be Water Supply Paper #713.

Q. At page 66?

A. Yes, sir.

Q. And for 1932?

A. That is Water Supply Paper No. 728 at Page 122.

Q. I notice on the 1921 table of gauge readings, that Dam #4 and Lock #4, has in there a statement "Dam down," between two stars. Can you tell me what that means?

A. Between the two dates starred, Dam #4 was down, open river.

1059 Q. And what dates are shown on that?

A. The dates of October 11th to 18th inclusive, 1921.

Q. Can you give me the upper pool gauge reading and normal pool of Lock #4?

A. The upper pool normal gauge reading is 14.00 on No. 4.

Q. Can you tell me when the wickets would be lowered on that lock or that dam?

A. The wickets are usually lowered when the river is rising and before the water gets high enough to run over the top of the wickets as much as one foot, in order to prevent destruction of the wickets.

Q. I notice on the 1921 gauge reading, upper pool gauge reading for Lock and Dam #2, is given as 19. Can you examine that table and tell me if that shows that that dam was leaking during that month?

A. It was leaking because the upper pool went below 19.00, which was the normal pool elevation.

Q. Can you determine from this chart the amount of the leakage?

A. You cannot from these gauge readings.

Q. Can you from the gauge readings taken above the dam determine the flow or discharge past the dam?

A. This #2 Dam has a rating curve. From the rating curve and the gauge readings you can determine amount of water past the dam.

Q. Would you determine that from the gauge above the dam or below the dam?

A. That rating curve applies to the gauge above the dam in this case.

Q. And for #3, how would you determine the discharge past the dam?

1060 A. No. 3, is also a fixed dam, but we have no rating curves for the upper gauge. We would determine the flow past the dam by reading the lower gauge.

Q. So that by reading the lower gauge, you would determine there was a certain discharge past Dam #3?

A. Yes, sir.

Q. Could you tell from that reading whether it was a discharge obtained by leakage or through lockage or in what manner the water passed the dam?

A. The lower gauge indicates the state of the river there without regard to how it comes through the dam. You could not tell the leakage through the dam.

Q. I notice that the figures for 1932 of Upper Pool gauge readings for Lock and Dam #26, is given as 16.90, whereas the gauge readings during the month of September, 1932, are in excess of 16.90. Can you explain why that happened, if you know?

A. This was September 1932, and I know that the river was low and the gauge reading does not indicate the flow because in low water times they try their best to hold the pools at normal or higher. The reason for this is to give the required depth in the upper end of the pool.

Q. Now I show you Government Exhibit 113, which is entitled "Kanawha and New Rivers, Hydrographs at Gauging Stations with Published Mean Daily Flows for July and August, 1932," and will ask you to examine that.

(Witness examines said Exhibit 113.)

Q. Was that prepared by you or under your supervision?

A. It was prepared under my direction.

Q. Can you tell me what these various lines represent on this chart?

1061 By Mr. JACKSON. Q. Are you speaking now of Exhibit 113?

By Mr. GATCHELL:

A. Yes, sir.

A. These are stage hydrographs taken from the recorded charts with the figures each day showing average daily discharge for that day.

Q. Do these hydrographs shows New River at Galax, Virginia, at Ivanhoe, Virginia, at Allisonia, Virginia, at Eggleston, Virginia, Glyn Lyn, Virginia, Greenbrier, at Alderson, West Virginia, the Gauley River at Belva, New River at Caperton and Kanawha River at Kanawha Falls?

A. They do.

Q. Can you tell me what stations are automatic recording gauges?

A. They are all automatic recording gauges.

Q. Did you take these hydrographs from the charts of the recording gauges?

A. Yes, sir.

Q. Did you use the originals to put them on this chart?

A. The originals in this case were used, received from the U. S. Geological Survey.

Q. The figures appearing on each day right over the particular gauging station, right over the hydrograph for the particular gauging station, were obtained from what source?

A. They are the average daily flows obtained from the Water Supply Paper of the U. S. Geological Survey.

Q. Can you tell me what Water Supply Paper you obtained them from?

A. You mean this Chart #113?

Q. Yes, sir.

A. They were obtained from Water Supply Paper 728.

Q. Can you give me the page?

A. Page 90.

1062 By Mr. JACKSON:

Q. Are you giving them for the various gauges?

A. I can, if you wish me to.

A. They are continuous from page 90 to page 95.

Q. Of what paper?

By Mr. JACKSON:

A. Water Supply Paper 728.

Q. And you say pages 90 to 95?

A. Down river to Hinton-next Alderson, page 113, Caperton, page 96, Belva, page 115, Kanawha Falls, page 102.

Q. I show you Government's exhibit 114, entitled Kanawha and New Rivers, hydrographs, gauge stations, July-August, 1930, and ask you if that was prepared in your office?

A. Yes, sir.

Q. What does it purport to show?

A. It is similar to the other Exhibit—it shows stagegraphs from the recorder sheets; also mean daily discharges from the Water Supply Papers.

Q. Were these hydrographs taken from the original recording charts?

A. I cannot say for certain whether or not they are originals or prints in this case.

Q. Where were they obtained from?

A. They were obtained from the United States Geological Survey Engineers—from the official recorder sheets.

Q. The figures appearing in the columns and right over the hydrographs for each day, show what?

A. Show the mean daily discharges at the stations for a given date.

Q. And from what source were these obtained?

A. From the Water Supply papers.

Q. Give the dates——

1063 A. Exhibit 114—discharges were obtained from Water Supply papers 713, pages 59 to 66 and 77 to 80.

By Mr. JACKSON:

Q. Are you sure that is right?

A. 713.

Q. We have 698. I wondered if you had misread your notes?

A. Have you 713?

Q. I will not interrupt you now. I thought perhaps you had through inadvertence read your notes wrong.

By the COURT. Q. Are these Water supply papers for a definite period of time?

By Mr. GATCHELL. A. Yes, sir.

By the COURT:

Q. What does it say on the title page?

A. Some of these records are not published in the yearbook.

A. We have a number——

By Mr. GATCHELL:

Q. (Interrupting.) Look at plaintiff's exhibit No. 82, Water Supply Paper 713, and I ask you if page 59 gives the daily and monthly discharge in second-feet for 1930 and 1931, on New River near Galax, Virginia?

A. Yes, sir.

Q. Is that the source that you obtained the figures for chart 114?

A. Yes, sir.

Q. Do those pages continue on to page 66?

A. Yes, sir; to page 66—Kanawha Falls.

Q. And also page 77?

A. Seventy-seven is on the Greenbrier, but 80 concludes with Belva on the Gauley River.

Q. Mr. Teeter, I show you Government Exhibit 115—Kanawha and New Rivers—discharge at gauging stations; United States Engineers' Office, Huntington, West Virginia, January, 1936. Was that compiled in your office?

1064 A. Yes, sir.

Q. Under your direction and supervision?

A. Yes, sir.

Q. Can you tell me what is shown on this chart?

A. This chart shows the flow in cubic feet per second for the period July 16th to 25th, inclusive, 1930.

Q. At several gauge stations depicted thereon?

A. Yes, sir.

Q. Can you tell me from what source the hydrographs shown on this chart were obtained?

A. They were obtained from the prints or original charts by converting stages into discharges.

Q. And were those original records obtained from automatic stage recorders?

A. They were—all those stations, yes.

Q. I have just shown you three hydrographs, Exhibits 113, 114 and 115, which you say were prepared in your office. Can you tell me for what purpose those were obtained?

A. (Witness examines papers.) They were—no, sir.

Q. Were you informed at the time that you were instructed to prepare them, for what use they were to be made?

A. I was not informed, no, sir.

Q. I show you government exhibit 116, Kanawha River profile, back water studies, and ask if you recognize that chart?

A. Yes, sir.

Q. Is that a chart prepared in your office?

A. Yes, sir.

Q. Can you tell me what the lower jagged line represents, starting with Gallipolis locks and dams and extending to Kanawha Falls?

A. The lower jagged line represents river bottom on the sailing line of the river.

1065 Q. Is that a standard chart in your office?

A. Yes, sir.

Q. The next line is a fairly regular line, entitled "Low Water Flow, 1,000 C. F. S. Is that a standard chart in your office?

A. Yes, sir.

Q. The next line shows normal pool elevation of Gallipolis locks and dams, Winfield locks and dams, Marmet Locks and dams, and London locks and dams. Was that put on in your office?

A. Yes, sir.

Q. There are some figures inserted—back-water elevations, 2,000 C. F. S., elevation 538.06 at Gallipolis pool, shown before putting in the Winfield lock and dam. Were these back-water elevations computed in your office?

A. Yes, sir.

Q. How were they computed?

A. These flows were computed by ordinary back-water methods.

Q. Tell me what that method is?

A. Take the stretch of the river—divide it into sections where the channel is uniform throughout these different sections—we plot the cross-sections of the river; take the mean section, obtaining the area and hydraulic functions and by hydraulic back-water formula compute the rise from each section consecutively and get to the next dam above.

Q. What formula did you use to compute the back-water elevation?

A. By the Manning formula.

Q. Does that formula take into consideration the friction of water moving down stream?

A. It does; yes, sir.

1066 By the COURT. Q. You say "back water elevation"—is that the back water "curve" referred to frequently?

A. Yes, sir.

By Mr. GATCHELL:

Q. I notice that the figures given here are for back water elevations when the flow is two, six, and ten thousand second feet at each of the three dams on this chart,—London, Marmet—at the toe—the three dams on the chart—London, Marmet, and Winfield. Is that the normal way the river flows for an absolutely uniform flow at several places widely separated on the river?

A. This does not represent natural discharge. The problem given us was to compute back water for uniform flow, as stated here.

Q. That is, you were told to take these flows and compute back water elevations at the points indicated?

A. Yes, sir.

Q. Did you make the computations or were they made under your supervision?

A. They were made under my supervision.

Q. One further question—in these normal pools, would the back water be the same—have the same elevation as the crest of the dam?

A. The back water curve would rise as you proceed up the river, according to the flow.

Q. I show you Government Exhibit No. 117, "a" to "f," inclusive, and ask if you will examine these charts and state if they were prepared in your office. (Hands to witness?)

A. Yes, sir; they were.

Q. Under your supervision?

A. Yes, sir.

Q. Take the first chart, No. 117-a, entitled rating curves, Kanawha River, Lock 2, London dam to Lock 3, and explain to me what the top line represents?

1067 A. That highest curve there is London lower pool with Old Lock 3 in place.

Q. Was that computed prior to the construction of the London dam—was that computed, showing the curve, prior to the construction of the London dam?

A. Yes, sir; it was computed with data obtained before the London dam was constructed.

Q. Would it show the rating curve prior to that time?

A. Yes, sir; at the London site.

Q. Can you—I call your attention to a line entitled "London lower pool with Marmet in place". Can you tell me if that was computed after the London dam was built and after the Marmet dam was built?

A. It was—based on actual observation.

Q. Was the line—London lower pool—with old lock 3 in place, based on actual observation?

A. It was with a gauge at the London site.

Q. With a gauge at the London site. And did you use in that—making that curve, did you use gauges located at any other places?

A. The gauge at Lock 3 was used, but this curve is the rating curve of the river at London site.

Q. And not at old lock 3?

A. No, sir; not at old lock 3.

By Mr. JACKSON. Q. Which line?

A. The top line.

By Mr. GATCHELL. Q. I call your attention to a line entitled Lock 2, lower pool, two lines adjoining and extending across the page. Tell me at what point that rating curve would apply?

A. That is the rating curve for old lock 2 at the lower gauge.

1068 Q. Below Lock 2?

A. Yes, sir.

Q. Was it obtained from actual measurements?

A. It was obtained by the use of the rating curve for the upper gauge at Lock 2. This curve was determined by measurements.

Q. I notice that line splits that line extending almost straight from a point 816 gauge across the sheet to approximately sixteen hundred four gauge—the lower curve, however, which joins at approximately 12 gauge drops in a sharp curve to approximately four gauge. Please explain why these curves are drawn in that manner?

A. That Lock two, lower pool, represents the conditions as constructed, with number 3 dam in place. The lower curve represents the rating of the river without Lock 3 or with open river.

Q. By "open river", do you mean wickets down on No. 3?

A. Three is a fixed dam. This is a theoretical condition, as if Lock 3 was not in.

Q. That is computed solely from estimates?

A. This is drawn in from estimates. We start off with zero flow, which is obtained by the survey chart of the river. We know that point. We know the point of approximately 1000

second feet flow, the elevation—which is elevation of low water. The curve continues until it reaches No. 2, lower pool curve, at the point where No. 3 would be drowned out.

Q. The bottom rating curve on this chart is for Lock 3, lower pool, and continues up to Lock 3, open river—will you explain how that was prepared?

A. Number 3 is a fixed dam; this curve applies to lower gauge; this is above No. 4, movable dam, so it has two curves at the lower end, one applying to the condition when the dam 4 was up and the other when No. 4 dam was down.

1069 Q. How did you arrive at the zero on these rating curves?

A. You mean zero flow or the zero of the——

Q. (Interrupting.) Zero of the gauge?

A. The zero gauge is given to definite elevation. The zero flow is the beginning of the curve—represents the elevation of the water, if there were no water flowing.

Q. And can you tell me at what point on this gauge there would be—at what point on the chart would show no water was flowing. What would be the elevation for the several locations?

A. Lock 2, zero, flow, gauge 3.8.

Q. And what elevation?

A. Elevation 586.7.

Q. Lock 3.

A. Zero flow from 3—gauge 0.6; elevation 571.5.

Q. Can you give the low water flow at London dam?

A. London low water elevation is 583.5; giving gauge reading 5.5.

Q. I notice on Exhibit 116, Kanawha River profile, and notice that the elevation of the upper London lock is 596 and the lower London lock 578. Does that appear on the chart you have?

A. It does. It is stated here zero flow London 578; this is the elevation of the lower gate sill.

Q. Turning to Exhibit 117–b, entitled "rating curves Kanawha river, Lock 4 and 5, and Marmet. They were similarly prepared under your direction, were they?

A. Yes, sir.

Q. And it shows Marmet—the dotted line shows Marmet with the Winfield dam in place, and Marmet (1935 with pool 6) there is also a line described "Marmet lower pool (1935)," the rating curve for Marmet 1935, on pool 6, produced below and the

1070 elevation of Marmet lower pool 35. Can you explain why that was produced below there?

A. This 1935 is—this is above No. 6, movable dam, which is the next dam below Marmet. The low water flow on Kanawha

River is about 1,000 second feet, and is shown here pool stage. This line runs below the pool stage, meaning if the flow decreases, the pool would not stay at normal. It would go down.

Q. When would it decrease—at what time? What stage of the flow?

A. At 1,000 second feet, shown here.

Q. Or less?

A. Decreases at that; it starts decreasing at 1,000.

Q. Does that indicate anything as to the water tightness of dam 6?

A. Well, it shows that the leakage through the dam would be probably more than 1,000 second feet. There is 1,000 second feet coming in—and—the pool elevation went down.

Q. And similarly the curve for Lock No. 4 lower pool, and Lock No. 5 lower pool, dropped below the straight line, horizontal line, for Lock No. 4 normal lower pool and Lock No. 5 normal lower pool. Can you give me the explanation for that lowering of the curve?

A. That is the same way as mentioned before. These lower pools have the next lock below them movable dam, of course, and with very low flows could not be held at normal. The pool could not be held at normal.

Q. Can you tell me what rating curves on that chart were obtained by actual measurement?

A. This curve, Marmet 1935 with Pool No. 6, that is based on current meter measurements.

Q. Is there any other rating curve on that chart?

1071 A. Lock No. 4 and Lock No. 5 are based on rating curves and measurements at Kanawha Falls.

Q. And were those computations made in your office?

A. The curves were plotted in my office from gage data corresponding to the flows at Kanawha Falls.

Q. And did you prepare the gage data?

A. The gage readings were official readings from the locks.

Q. Those are similar readings to the gage readings shown you previously as Government Exhibits 110 and 111?

A. Yes.

Q. And are a part of the official files of your office?

A. Yes, sir.

Q. By using those gage readings you prepared the rating curves for Locks 4 and 5?

A. Yes.

Q. Will you turn to Exhibit 117-C, rating curves, Kanawha River, Locks 6, 7 and 8. Are those similar rating curves to those you have just explained?

A. They are.

Q. Were they prepared in your office?

A. Yes, sir.

Q. Under your supervision?

A. Yes, sir.

Q. Can you tell me the data from which you obtained the rating curve, Lock No. 8?

A. This curve was prepared by plotting gage readings for No. 8 for the flow at Kanawha Falls, increased according to the drainage area.

Q. And did you have any actual measurements for No. 8?

A. We have a few measurements at Lock No. 8 which we use to check the curve.

1072 Q. And Lock No. 6 curve, can you tell me how that was prepared?

A. That was prepared by plotting the gage reading for No. 6 corresponding to flows at Kanawha Falls, checked also against the rating curve for No. 5.

Q. And for Lock No. 7 what were your sources of data?

A. This was prepared by plotting gage readings for No. 7 corresponding to stream flow at Kanawha Falls, increased approximately proportional to the increase in drainage area.

Q. And did you check that by any measurements?

A. No. 7 was not checked by measurements.

Q. Exhibit 117-D, Kanawha River rating curves, Lock No. 9 and Winfield. Was that prepared under your supervision?

A. Yes, sir.

Q. Can you tell me the data for Lock No. 9 curve?

A. Lock No. 9, lower pool gage, was prepared by plotting gage readings, lower gage, corresponding to flows computed between Locks 8 and 9 which were based upon rating curve for Lock 8.

Q. And the rating curve for Winfield, how was that prepared?

A. Winfield site is about midway between Lock 8 and 9. The gage readings were determined by proportional distance between Locks 8 and 9 plotting those with corresponding flows computed from Lock 8 rating curve.

Q. And was that checked by any actual measurements?

A. We had measurements at Lock 8, basing the Lock 8 rating curve on those measurements.

Q. Government Exhibit 117-E, entitled rating curves Kanawha River, Locks Nos. 10 and 11—was that prepared in the same manner?

A. Prepared in the same manner as the upper locks.

Q. And can you tell me the data from which you obtained the rating curve for Lock No. 10?

1073 A. It was obtained from Kanawha Falls discharge, also from Lock 8 discharge.

Q. And was that checked by any actual measurements?
A. No, sir.
Q. And Lock No. 11—from what sources did you obtain the rating curve for Lock No. 11?
A. That is made the same way as No. 10.
Q. And was that checked by any actual measurements?
A. No, sir.
Q. And the final one of this series, 117-F, rating curves, Ohio River below Point Pleasant—was that prepared under your supervision?
A. Yes, sir.
Q. The top lines show Gallipolis dam and with the dam in place and the pool elevation. What that estimated or measured?
A. That was estimated for the site which is below the mouth of the Kanawha River.
Q. Was that checked by any actual measurements?
A. No, sir.
Q. The lower one is for Dam No. 26. Can you tell me the data from which you prepared that rating curve?
A. This lower curve is not a rating curve at Dam No. 26. It is for a point below Point Pleasant.
Q. How far below Point Pleasant?
A. At the mouth of the Kanawha River. It says here "Mile 266" which is approximately the mouth of the Kanawha River.

By Mr. JACKSON:

Q. Where is the mile given on the chart?
A. This horizontal line says "Low water, Mile 266."

By Mr. GATCHELL:

Q. Where is Dam No. 26 with respect to the point of measurement for that curve?
A. Approximately 13 miles below.
1074 Q. It states on there "Normal lower pool, elevation 519.5." Will you explain that line?
A. That states normal lower pool just as the preceding curve stated it. However there is no dam at this point. This pool 519.5 extends past the mouth of the Kanawha River.
Q. Then the use of the word "lower" in that designation "normal lower pool" would appear to be misleading; is that correct?
A. It is somewhat misleading. Just "normal pool" would be better.
Q. Does that normal pool extend from the mouth of the Kanawha down to Dam 26?
A. It extends from 26 past the mouth of the Kanawha to Dam 25.

By Mr. JACKSON:

Q. Is that the same as the upper pool of Dam 26?

A. Correct.

By Mr. GATCHELL:

Q. Dam 25 is located above the mouth of the Kanawha?

A. Yes, sir; five miles above.

Q. Would you mind turning back to No. 117–B, the second chart. I notice on Exhibit 116, Kanawha River profile, that the elevation of the lower sill at the Marmet Lock is given as 554. Is that shown on this chart, Exhibit 117–B?

A. Down at the bottom you will notice "Marmet 554.0 equals zero flow."

Q. Are the back-water elevations the same on the Kanawha River profile, Exhibit 116, as shown on this rating curve, 117–B, and the other rating curve for London and Winfield?

A. This 117–B has a curve, Marmet with Winfield dam in place, which is obtained from back-water. However it is obtained under different conditions from that exhibit you mentioned.

Q. Exhibit 116?

A. Exhibit 116.

1075 Q. Can you show me from Exhibit 117–B the elevation of the Marmet pool with the Winfield dam in place when the discharge is 2,000 second feet?

A. On this curve 2,000 second feet shows gage 12.3.

Q. And what elevation would that be?

A. That is 566.3.

Q. I notice on Exhibit 116, Kanawha River profile, the back water elevation for 2,000 second feet at the Marmet dam is shown as 566.10. Can you explain this discrepancy?

A. This back-water curve was made recently, an independent study without reference to this rating curve.

By Mr. JACKSON:

Q. Do you refer to 116 when you say the back-water curve was made recently?

A. 116. For the conditions as stated, with the same flow throughout the pool, 2,000, 6,000 and 10,000, while this rating curve below Marmet represents the average flow under natural conditions. Under natural conditions the flow increases down the river so that the flow at Winfield site would be considerable more than Marmet and you would expect the rating curve to show a slightly higher reading for the same natural flow than you would for a uniform flow below that point.

By Mr. GATCHELL:

Q. That is, the water that comes in between Marmet and Winfield increases the elevation of the back water at the toe of the Marmet dam as shown on your rating curve, whereas your computations of the back-water studies shown in Exhibit 116 assume a uniform flow of exactly the same flow at both Marmet and Winfield?

A. That is correct.

Q. Then am I to understand that this does not represent a natural condition in any way?

A. It would hardly be possible to have exactly the same flow throughout a pool as long as the Winfield pool.

1076 Q. That is with reference to Exhibit 116?

A. Yes, sir.

Q. I show you Exhibit 116, Kanawha River profile, 6 and 9 foot projects. Was that prepared in your office?

A. It is from a standard chart in the Huntington office. The coloring matter was not put on in the Huntington office.

Q. It was not put on in your office?

A. It was not.

Q. Do you know the purpose for which the coloring matter was put on?

A. No.

Q. Are any other lines or figures on this chart inserted there that were not put on in your office?

A. I see it has the line sloping above normal pool and also a dash line sloping below normal pool which were not put on in the Huntington office.

Q. Do you know why those lines were put on there?

A. That study was not made in the Huntington office. I do not know.

Q. Were any other lines on there that were made outside of the Huntington office?

A. No, sir; I do not see any.

Q. Are there any figures or statements on this chart that were not put on in the Huntington office?

A. The elevations and all figures, I think, were put on in the Huntington office.

Q. The lower jagged line extending from Gallipolis dam to Kanawha Falls represents what?

A. That is the bottom of the river on the sailing line.

Q. And the line next above that, extending from Gallipolis Locks to Kanawha Falls represents what?

1077 A. That is low water profile of the river. It says "Flow of 1,000 c. f. s."

Q. There are several lines above the heavy lines marking the elevation of the several dams proposed. Do these represent flows of the stream?

A. Those upper sloping dashed lines are profiles of certain floods.

Q. And who selected the dates of those floods?

A. They are the highest flows that we have record of, platted on this chart.

Q. And were they placed on this chart especially for some purpose in this suit, do you know?

A. No; they were originally on the Huntington office chart.

By Mr. JACKSON:

Q. The question was why they were placed on this chart?

A. As a record of the profiles of the high water flows.

By Mr. GATCHELL:

Q. I understand that you did not prepare in your office those lines appearing on the several pool elevations, dashed lines immediately above and immediately below the normal pool elevations; is that correct?

A. Yes.

Q. Did you prepare in your office the normal pool elevation of each dam?

A. That is on the original chart.

Q. I show you Exhibit No. 119, Kanawha River and Tributaries, proposed improvements, and will you tell us if that was prepared in your office and under your supervision?

A. That was prepared in our office but not under my supervision.

Q. Was the whole map prepared in your office?

A. Except the coloring matter was not put on.

Q. The coloring matter was not put on in your office?

1078 A. No, sir. I believe the rest was. Here are a couple of projects shown at the top of the map.

Q. Shown in colors?

A. Shown in colors.

Q. And you didn't put on any colors?

A. No.

Q. And is this a standard map of this river system in use in your office?

A. Yes, sir.

Q. And from what source did you obtain the data showing where tnose proposed improvements were to be located?

A. They are projects proposed in the 308 Report.

Q. Of the Kanawha River system?

A. Of the Kanawha River system.

By Mr. JACKSON:

Q. Will you give the official number of that 308 Report. I understand there are a series of 308 Reports.

A. No. 91, House Document No. 91, 74th Congress, 1st Session.

By Mr. GATCHELL:

Q. I show you Exhibit 120 Kanawha River and Tributaries, Proposed Improvements, Profiles. Was this chart prepared in your office?

A. Yes, sir.

Q. And what does it represent?

A. That represents the low water profiles of the main streams of the Kanawha River and tributaries.

Q. Were the profiles of the proposed projects placed on this chart in your office?

A. Yes, sir.

Q. Was the coloring matter placed on there in your office?

A. No, sir.

Q. There are certain lines appearing on this chart in the middle of several of the profiles of improvements. Were those lines placed on there in your office?

1079 A. No, sir; neither those lines nor the coloring matter.

Q. Did you place on there the outline of each improvement?

A. Yes, sir.

Q. And nothing more than the outline?

A. That is right.

Q. Can you tell me from what data the profiles were prepared?

A. The profiles of these streams were prepared from all available reliable data, including United States Geological Survey charts, old surveys in Chief of Engineers reports, plans of Power Company applications and any local survey that was available.

Q. Mr. Teeter, in your statement yesterday you gave some mileages on the Ohio River. Have you found any error in mileages as given on the Ohio River?

A. There was one little error in the distance to one of the locks. I would like to make a correction. The distance to Lock No. 27 from the mouth of the Kanawha River is 35.3 miles and the distance from Lock 27 to Lock 26 is 22.5 miles.

By Mr. GATCHELL. Q. That appears on page 2245 of the record?

By the COURT:

Q. On yesterday you gave the distance from Lock No. 9 to the mouth of the Kanawha River as 25.4. The maps shows 25.5. I don't think it is enough to make much difference.

A. Your Honor, the mileages I gave were from the most recent survey of 1930, while those are recorded mileages on old charts.

By Mr. GATCHELL:

Q. In testifying about Exhibit No. 114 you gave reference to certain water supply papers. Do you have any corrections to make in those references?

A. A statement was given that the water supply paper was No. 713, whereas it should have been No. 698.

1080 Q. And do you have the page references in water supply paper 698?

A. They run from page 61 to page 67, also pages 75 and 79.

Q. I show you Government Exhibit No. 52, entitled "Rating curve for Kanawha River at Kanawha Falls, West Virginia," and ask you to examine that rating curve. Are you familiar with that curve?

A. This is an official rating curve made by the United States Geological Survey. It is the curve that we use in our computations or rather is the rating curve we use.

Q. It is the rating curve you use in your computations in figuring the discharge at Kanawha Falls?

A. Yes, sir.

Q. And I show you Government Exhibit No. 53, entitled "Rating curve for New River at Caperton, West Virginia," and ask you if you are familiar with that rating curve?

A. Yes, sir, this is United States Geological Survey Rating Curve for the station at Caperton, West Virginia, which we use.

Q. You use this also in making your calculations of discharge at Caperton?

A. Yes.

Q. I show you Government Exhibit No. 66, being "Rating curve for New River at Glen Lyn, Virginia, and Eggleston, Virginia, at Dam Site A near Radford, Virginia, at Allisonia, Virginia and at Ivanhoe, Virginia," and ask you if those rating curves, with the exception of the one for Dam Site A, were used in your office?

A. That is right, they were.

Q. And they were used for what purpose?

A. They were used for obtaining the discharges at these points.

1081 Q. I show you Government Exhibit No. 143, entitled "New-Kanawha River, power waves, period of March 11th to April 3rd, 1930, inclusive," and ask you if you recognize that chart?

A. Yes, sir.

Q. Did you assist in the preparation of that chart?

A. I helped make this chart, yes.

Q. And from what data did you obtain the figures to make the curves shown on this chart?

A. They were obtained from prints of the recorder charts taken from the gaging stations by the United States Geological Survey.

Q. Were those prints supplied to you by any other agency?

A. No, sir; no other agency had them. The United States Geological Survey supervised all of these stations.

Q. Did they give you the prints?

A. Yes, sir.

Q. What do these lines represent on this chart?

A. I wish to correct the previous statement. I see this includes locks on the Kanawha River which the United States Geological Survey did not supervise. They were read by the regular lock Masters at Locks No. 9, No. 7, No. 6, No. 11, No. 4, No. 5, and No. 2 on Kanawha River.

Q. Did you prepare the graphs for those several locks on the Kanawha River from the records supplied your office by the lock tenders?

A. Yes, sir.

Q. Were those staff readings?

A. Yes, sir.

Q. And what was the interval at which the staffs were read?

A. At this time they were read at intervals of one hour or shorter intervals.

1082 Q. At least one every hour?

A. One hour.

Q. During the entire period shown on this graph?

A. Yes.

Q. And were those staff readings taken by the men who took the regular staff readings for the Huntington office?

A. Yes, sir.

Q. And were they sent in to your office by those Lock Masters.

A. Yes, sir.

Q. Then, Mr. Teeter, I wonder if you have shown anything else on here that was supplied to you from any records supplied by the Geological Survey on this particular chart?

A. I see there is a station here on Elk River which is maintained by the Geological Survey and this curve was plotted from their chart.

Q. For the Elk River?

A. For the Elk River only.

Q. The other graphs were prepared from data supplied by the lock masters?

A. Yes, sir.

Q. Did you check these curves after preparation to determine if they were accurate?

A. They were checked to determine the accuracy corresponding to the official gage reading.

Q. Mr. Teeter, how long have you been engaged in work of the type which you now perform at the Huntington office?

A. I have had hydraulic studies pertaining to stream flow, backwater, and so forth, for approximately fifteen years.

Q. And in making your computations for the backwater curves, did you use a method in use in your office or some other place?

1083 A. The standard method, instruction given in engineering schools, and standard engineering text books.

Q. That was the method you used?

A. Yes, sir.

Q. Is that accepted in engineering circles?

A. It is.

Q. And in making your computations of the discharge of the New and Kanawha Rivers at various gaging stations, what method of computing those discharges did you use?

A. Discharges on New River were taken either from the publications of the Geological Survey or computed from the rating curves of those stations.

Q. And the discharges on the Kanawha River?

A. The discharges on the Kanawha River at Lock 2 from the rating curve, at Lock 5 we had a rating curve and at Locks 8 and 9 we had a rating curve, prepared from actual stream measurements.

Q. And did you apply the usual principles of computation in determining the discharge from those rating curves?

A. Yes, sir.

By Mr. JACKSON:

Q. What were the locks you said you had rating curves for?

A. No. 2, No. 5 and Locks 8 and 9 together.

By the COURT:

Q. I want to ask Mr. Teeter one question which I don't think is particularly pertinent. It might clear up something in my mind. In looking through those water Supply Papers yesterday, I noticed that the minimum flow recorded at Hinton, I think it is, in Water Supply Paper 698, there were certain dates—October 9th in some year, that it was something like 700 cubic feet a second. The minimum flow recorded at Glen Lyn, substantially up the stream, was something over 800 cubic feet a second. How is it possible for the minimum flow downstream to be less than the flow upstream? Under what conditions could that happen?

1084 A. It does happen during the lowest periods of flow. Evaporation, seepage, and so forth, decreases the amount of water in the river. At the same time, the inflow from side streams is practically nothing. However, this Hinton station has no rating curve. That flow given was probably estimated from some other point.

Cross-examination by Mr. JACKSON:

Q. Mr. Teeter, can you refer to any simultaneous measurements on New River where it was found that the flow downstream was less than the flow upstream?

A. The measurements on New River were made by the United States Geological Survey.

Q. They weren't measurements, Mr. Teeter; they were simply estimates based upon a computed rating curve, were they not?

A. The rating curves were based upon measurements.

Q. The point I am getting at, do you know of any instance where there were simultaneous measurements made, allowing for lag in the flow, at two different points on New River and it ever was found that the flow downstream was less than the flow upstream?

A. We have the records of the Geological Survey only. I have made no measurements myself.

Q. You know of no record of the Geological Survey where the measurements at the two places on the river were simultaneously made, allowing for lag, and they found a result whereby the flow downstream was less than the flow measured upstream?

A. I cannot cite you any such measurements. I did not make them.

Q. From your familiarity with the Water Supply Papers, Mr. Teeter, can you not say that there are a number of instances
1085 where the flow, as recorded in those papers, for upstream gaging stations is so very much greater than the comparable flow recorded in those papers for the downstream station that as an engineer you know those records are in error?

A. I am not an authority on New River flow.

By Mr. JACKSON:

Q. You have used in these exhibits about which you have been testifying a good many figures taken from the Water Supply Papers; is that right?

A. Yes, sir.

Q. And am I now right in understanding your testimony to be that your part in preparing those exhibits was merely to plot the results of those readings upon the charts and that you and your office do not know anything about the accuracy of the figures or vouch for them?

A. We do not vouch for the figures of the United States Geological Survey.

Q. To clear up this particular point, if I can, Mr. Teeter, I would like to show you, as an illustration, page 65 of Water Supply Paper 543 and ask you to look at the first column, the left-hand column covering October, 1921, and tell me what was the minimum flow at Eggleston at any time during that month?

A. 905 second feet.

Q. That is daily average?

A. Yes.

By Mr. GATCHELL. Q. Will you give the date of that minimum flow?

By Mr. JACKSON:

Q. That is October 26, 1921, is it not?

A. Yes, sir.

Q. Now, I want to show you page 99 of Water Supply Paper No. 728 and direct your attention to the first column on the left-hand side of that page giving at the top of the page the minimum average discharge at Kanawha Falls for October 1921, and ask you what the minimum discharge is as shown there?

1086 By Mr. GATCHELL. Q. Do you want to correct that to say the minimum daily discharge?

By Mr. JACKSON:

A. Yes; for any day.

A. The minimum daily discharge for October, 1921?

Q. Yes, at Kanawha Falls?

A. 770 second feet.

Q. Isn't it 690?

A. 690 second feet.

Q. On October 29, 1921; is that right?

A. That is right.

Q. According to the Water Supply Papers then, it appears that the minimum average daily flow at Eggleston during October, 1921, was estimated at 905 second feet and the minimum average daily flow in October 1921, at Kanawha Falls was estimated at 690 second feet?

A. Those were the same dates?

Q. No, there is a lag, but this is the minimum during the month. You would expect a lag, wouldn't you?

A. Yes.

Q. The lag is about three days there. As an engineer would you not say that any flow figures which gave a flow at Eggleston of 905 second feet minimum daily flow with a minimum daily flow at Kanawha Falls of only 690 second feet reflected some error.

A. No, sir; I wouldn't say that.

Q. Is it your judgment that the evaporation from Eggleston to Kanawha Falls would account for the diminution in flow plus the inflow between those two points?

A. It might be evaporation and seepage. I know that many rivers decrease in flow downstream.

By Mr. JACKSON:

Q. I am talking about New River. What do you know about that?

1087 A. It is possible on New River.

Q. That is, one quarter of the Eggleston flow, in your judgment, plus all inflow would disappear between Eggleston and Kanawha Falls?

A. It could happen.

Q. Mr. Teeter, have you observed that even during these low water periods that only very occasionally the flow downstream is less than the flow upstream? Did you observe that in looking at these records?

A. That is true on New River.

Q. And did it strike you as odd that evaporation should be so much greater on one day than another during low water so that it would produce a diminution of 25 percent in the flow, plus accounting for all inflow, whereas on other days that result would not obtain?

A. You are not so certain about the lag and about the inflow, about evaporation and seepage. I think that would be possible.

Q. That is, you wish to testify that the evaporation and seepage on New River during low water periods may vary in such proportion from day to day that at times it will account for 25 percent of the flow at Eggleston, plus all inflow between Eggleston and Kanawha Falls, and at other times it will not have that effect?

A. The factors affecting discharge may vary that much.

Q. The factors we are talking about now are evaporation and seepage. Do they vary from day to day?

A. Evaporation varies according to temperature.

Q. In October is evaporation a serious factor?

A. Not particularly.

1088 Q. It would be a pretty serious factor to account for 25 percent of the flow plus inflow between Eggleston and Kanawha Falls, wouldn't it?

A. There be other subtractions from New River. I don't know.

Q. What do you think they are?

A. I don't know.

By Mr. JACKSON:

Q. So you can't account for this diminution in the instance I called to your attention other than through evaporation?

A. It might be caused by evaporation, seepage, or other subtractions.

Q. But you just said you don't know of any other subtractions?

A. I don't know of any other but I say it might be caused by them.

Q. And where could the seepage go?

A. Seepage from the stream?

Q. Yes.

A. It goes into the bed of the stream.

Q. And does that never come out on a river like New River?

A. It comes out in time.

By the COURT:

Q. If the water were impounded at any place between these points of observation, that might account for it, might it not?

A. It could. I know of no impounding.

Q. I was going to ask you if there was any point along there where it could have impounded?

By Mr. JACKSON:

Q. Do you wish to testify in your opinion that the discrepancy cannot lie in mere inaccuracy of the estimates?

A. I do not vouch for the United States Geological Survey data.

1089 Q. That would be one explanation, wouldn't it?

A. Please state your question.

Q. Could not the explanation of the discrepancy lie in mere inaccuracy of the estimates made?

A. It is possible.

Mr. JACKSON. On Exhibits 110 and 111 there are a number of pencil figures about which questions have been asked and no one appears to know why they were put there. I understand it may be stipulated with counsel for the Government that these pencil figures may be excluded from the exhibits and then we will not need to inquire any further about them.

Mr. GATCHELL. That is correct, your Honor. The only reason I went into the pencil figures at all was to show that they were not put on by the Lock Master. The typewritten figures were put on by the Lock Master wherever the staff readings were made. The pencil figures will not be used in the later testimony.

Q. Mr. Teeter, on your direct examination your attention was directed to the figures for normal pool gage readings for Lock 4 on the first sheet of Exhibit 112, showing the gage reading for the

upper pool elevation at normal pool as 14 and certain figures of gage readings for the fore part of October, showing readings somewhat in excess of 14, and then you were asked under what condition the wickets would be lowered. I think you said they would be lowered before the flow overtopped the wickets by a foot; is that right?

A. Yes, sir.

Q. And then your attention was directed to readings for Dam #4 on page one of Exhibit #112 showing the dam was down from October 11 to October 18, 1921, is that right?

A. Yes, sir.

Q. Did you mean to imply that the dam was lowered because of high water?

A. No, sir. I didn't say that.

Q. I know you didn't say it, but I could not understand the purpose of your testimony otherwise. There is nothing on Exhibit #112, Sheet 1, under Dam #4, that would indicate that that dam was lowered because of high water, is there?

A. The records of the gage readings do not show that was why it was lowered.

Q. From your experience and skill as an engineer can you say from inspection of that sheet why it was lowered?

A. I think it was lowered for repairs, but I could not swear to that.

1090 Q. You testified that you determined flow that passed Lock #3 by reading the lower gage. Will you explain how you did that?

A. Knowing the flow at Kanawha Falls and reading the lower gage at Lock #3, the flow would be practically the same for Lock #3, for that gage reading.

Q. I am not quite clear on that. You mean you found out what the flow was estimated to be at Kanawha Falls and then reading the gage below Lock #3 simultaneously, you assumed that gage height corresponded with the same flow through Lock #3?

A. The period used was when Kanawha Falls was running uniformly so that lag would not matter and for that flow the gage readings were taken below Lock #3.

Q. I am trying to get at how you got the reading to apply to the gage below Lock #3, whether right or wrong, the process was you got the estimates of flow past Kanawha Falls and tied them in to a simultaneous reading of the gage below Lock #3?

A. Yes, sir.

Q. And in effect constructed a point on a rating curve for the gage below Lock #3?

A. Yes, sir.

Q. Isn't it a fact that the flow below Lock #3 was dependent upon the leakage in Lock #4?

A. No, sir.

Q. I mean, not the flow, but the gage height was dependent upon the leakage in Lock #4?

A. The gage height below Lock #3 would not be appreciably affected by the gage reading at Lock #4.

Q. Lock #4, or Dam #4, is the dam that retains the pool below Lock #3.

A. The next dam below and it is a movable dam.

1091 Q. Suppose you had a condition of no leakage, with the dam up, at Lock #4, and at another time you had a condition of leakage of 1,200 second feet at Lock #4, with the same stream flow in each case; is it your opinion the gage reading, the lower gage, at Lock #3, would be the same?

A. If the gage reading at Lock #4 was the same for those two conditions, the matter of whether Lock #4 leaked or not would not affect the reading at gage or Lock #3.

Q. I didn't say it would or would not be the same. I asked you whether, assuming two conditions, first, whether Lock #4 was up and no leakage, and the other where there was leakage of 1,200 second feet at Dam #4, with the same flow in the river, would the gage height on the gage below Lock #3 be the same in both instances, necessarily?

A. The gage height at the lower gage, at Lock #3, depends upon the flow in the river, also the elevation of the upper gage, at Lock #4. Now it is their object in maintaining Lock #4 to maintain the pool at normal or higher. The amount of leakage through Lock #4 will depend on how much caulking or needling they put on.

Q. Also on the condition of the dam, as I understand it?

A. Yes, sir.

Q. If there be a large amount of leakage at Lock #4 it will require a larger flow in the river to maintain the upper pool at stage than if there is no leakage?

A. Yes, sir; Lock #4.

Q. And that will be reflected in the flow in the upper end of the same pool, will it not?

A. The gage reading at the upper end of pool #4 is not affected by the leakage through Lock #4.

Q. The gage reading isn't?

1092 A. No, sir; if the elevation at Lock #4 is the same.

Q. The amount of flow is affected by the pool elevation at #4, isn't it?

A. Yes, sir.

Q. And that is affected by the amount of needling or caulking and leakage, isn't it, in low water?

A. The elevation at Lock #4 is affected by the tightness of Lock #4.

Q. And it follows from what you have just said the gage height at the foot of Lock #3 is affected by the tightness of Lock #4, doesn't it?

A. Not necessarily.

Q. May it be or may it not be?

A. It is affected by the elevation at Lock #4 and if that changes by leakage, then it would be affected.

Q. Now, Mr. Teeter, your attention was also directed to certain elevations of the upper pool at Dam #26, and I think you said that at periods of low water operators tried their very best to hold the pool at or above normal?

A. Yes, sir.

Q. Am I right in understanding that is because at low water it is or may be necessary to hold the pool at normal elevation in order to provide the project depth at the upper end of the pool, above the dam?

A. That is right.

Q. You also testified that Dam #2 had settled, Dam #2 on the Kanawha. Do you know to what extent Dam #2 had settled in 1925?

A. I do not know in 1925. It had settled.

Q. But no measurement was made at that time that you know of?

A. I do not know of any at that time.

Q. Do you know personally now the extent of the settlement of Dam #2 at any time prior to 1930?

1093 A. I don't know the extent.

Q. You did testify in 1930 the settlement of Dam #2 was measured and determined to be $1\frac{1}{10}$ feet?

A. Yes, sir.

Q. Do you know whether that settlement was uniform along the crest of the dam or did it vary from place to place along the dam?

A. I don't know the exact profile of the dam. It was extensive across the river, I think.

Q. Would the settlement of Dam #2 affect gage heights for a given flow of low water?

A. It would affect the gage heights above the dam.

Q. As I understand it on Exhibits Nos. 113 and 114, which are the staff hydrograph cases, you or your office simply took the data from the U. S. G. S. records and platted that on those charts?

A. Yes, sir.

By Mr. GATCHELL:

Q. I don't want to leave the wrong impression here. This covers also Kanawha Falls, the gage at Kanawha Falls. Was that taken from the G. S. records?

A. Kanawha Falls was.

Q. Mr. Teeter, I should like now to ask you a few questions about your Exhibit #116, which is entitled "Back Water Studies". I understood you to say this morning that these back water studies were made according to accepted methods, that is methods accepted among the engineering profession; is that right?

A. Yes, sir.

Q. There are a number of methods of making back water studies, accepted in the Engineering profession, are there not?

A. Yes, sir.

Q. And you selected the one of them that depends upon what you described as the Manning formula?

1094 A. The Manning formula was used.

Q. Is it not a fact back water studies are very complicated and involve the exercise of considerable judgment by engineers?

A. Not a great deal here, where we have rating curves to check our flows.

Q. Of course rating curves in turn are based upon estimates, are they not?

A. No, sir; they are based on stream measurements.

Q. To begin with a particular measurement is based upon some current meter readings, which are themselves subject to error, are they not?

A. Not by an experienced person.

Q. It is your testimony that an experienced person makes current meter readings with accuracy?

A. Yes, sir.

Q. No error of judgment on that?

A. There should be a definition of what error means.

Q. Isn't it generally recognized that current meter readings are subject to 5 or 10% errors?

A. I think so.

Q. Isn't it also a fact you simply take a few current meter measurements in a cross section, which may or may not give you the average velocity of that stream?

A. The measurements you take give you the velocity.

Q. At that particular point?

Q. A pin point in the stream?

A. The velocity is affected——

Q. I mean it is a pin point in the cross section of the stream cutting vertically across the river, isn't it?

A. The area a cross section has, at a station on the river, will extend up and down the river several feet.

Q. The river may be 600 feet wide, may it not?

1095 A. Yes, sir.

Q. And may vary in depths from five inches to twenty feet?

A. Across the river.

Q. And you will make a few spot current meter readings here and there in that cross section, won't you?

A. The meter measurements are made often, as often as the cross section changes.

Q. You try to get the average velocity of the water through the cross section?

A. Yes, sir.

Q. And that itself is subject to error, isn't it?

A. Possibly 5 or 10%.

Q. That adds on to the error in the current meter readings, of course, it is accumulative?

A. What is accumulative?

Q. The error of determining what is the average velocity of the water through the cross section? I mean the average velocity.

A. It gives you the average velocity.

Q. Now coming back to the question of back water studies, isn't it a fact that the Manning formula itself contains a factor involving judgment?

A. It contains a coefficient.

Q. And that coefficient has to be selected by the judgment of the engineer making the study?

A. It is preliminary, but checked from current meter measurements.

Q. And certainly unless the back water curve obtained by such studies is tested by actual observation, it is subject to varying degrees of error, is it not?

A. It is not positive, unless checked by actual current meter readings.

1096 Q. You would not want to testify any back water curve developed by computation and not checked by observation of conditions for which the back water curve was computed, would be entirely accurate?

A. I would call it an estimate.

Q. It would be an estimate?

A. Yes, sir.

Q. And the checking you can do on a back water curve applies only at the places where you make your measurements, is that right?

A. The checking of the elevation of the curve at that point is determined by the measurements at that point.

Q. Now what you have said about checking, applies in a case where the back water actually exists, doesn't it?

A. Yes, sir.

Q. And doesn't apply to the predicted back water?

A. It doesn't apply to the back water of a dam that isn't built, however, the coefficient would still be applicable.

Q. The coefficients can be checked only by observation, isn't that so, at specific points?

A. They are checked by current meter measurements for the stream channel. You can run other flows through the stream by these coefficients.

Q. You check your results at certain observation points on the river?

A. Yes, sir.

Q. And the corrections by observation can only apply actually where you make those tests?

A. Yes, sir; at the points.

Q. I now show you Exhibit #116. Where did you get the gage heights for that low water line or curve?

A. The elevation is given for that line.

1097 Q. On what data is that based?

A. The elevation is given on the profile. Knowing the zero of the gage you would have the stage.

Q. For low water flow?

A. Yes, sir.

Q. As I understand it, this low water flow line is drawn according to certain gaging heights, is that right?

A. It is drawn according to elevation.

Q. I want to know if you took those elevations from below the gage readings, or how you obtained them?

A. This chart has been drawn from the past evidence. I had nothing to do with the platting of the low water curve myself.

Q. You don't know the data from which the elevations for the low water curve were obtained?

A. No.

Q. I direct your attention to Plaintiff's Exhibit #117-a, and you will observe that your exhibit shows certain low water gage heights?

A. Yes, I remember that.

Q. Will you tell me the basis for those low water gage heights and elevations?

A. The elevation of low water is known, the elevation of zero is known, and you simply subtract.

Q. How do you know that?

A. From this profile, or I should say from the charts of the Kanawha River.

Q. What charts?

A. We had charts in our office.

Q. You had to have some data from which to draw those lines on the charts. I want the fundamental data?

A. I don't know the authority for that low water.

1098 Q. You don't know where those low water gage heights on Exhibit #117-a come from?

A. They were obtained by subtracting the zero of the gage from the elevation of low water, at that point.

Q. The only way you know low water was because there was a chart in the office?

A. A record in the office of low water.

Q. I am asking you as to the chart to see if from inspection you can tell us where these gage readings or low water appearing on Exhibit #117-a came from?

A. It is marked on the chart the low water. This is Kanawha River Chart #8 in the vicinity of Lock #2.

Q. That is U. S. Engineer office chart?

A. Yes, sir; survey of 1922-1923, inclusive, 1929 and 1930, the low water below Lock #2 is given as 589.61.

Q. That is the same as elevation on your Exhibit #117-a?

A. Yes, sir.

Q. Isn't it true the other low water elevations on Exhibits #117-a to #117-f, inclusive, as far as they relate to the Kanawha River were obtained from the same source?

A. Yes, sir.

Q. That is the low water of 1879, isn't it?

A. It is so marked.

Q. And did you assume it to be the low water of 1879?

A. The low water down the river probably isn't all the low water of 1879.

Q. We are talking about Exhibit #117-a, Lock #2?

A. Yes, sir.

By Mr. Gatchell. Your previous question referred to Exhibit #117-a to 117-f.

By Mr. JACKSON:

Q. I am confining this particular question to 117-a.

A. This particular lock is on this chart.

1099 Q. Is the same thing true of your low water elevation for Locks 3, 4, and 5, on Exhibits 117-a to 117-f?

A. They are taken from the charts. I am not positive.

Q. For the law water of 1879?

A. I am not positive the 1879 low water applies all the way down the river.

Q. Look at this.

A. That says 1879.

Q. You have no doubt of the source of that data?

A. That is 1879 at that point.

Q. Will you look at the same document and tell me if it isn't low water for 1879?

A. Lock #3, 1879.

Q. And you are now looking at the records for which lock?

A. Lock #4.

Q. At the foot of it?

A. 1879, Lock #4.

Q. Now will you look at the foot of Lock #5?

A. 1879, Lock #5.

Q. Do you know that these low water elevations on this Exhibit #117-a to 117-f were not taken from the readings of low water of 1879 at the locks farther down stream below Lock #5?

A. I think they were taken from the chart.

Q. As far as you know the basic data comes from the low water for 1879 for the other dams further down stream on the Kanawha?

A. Yes, sir.

Q. Now, Mr. Teeter, on your Exhibit #116, you have assumed a low water flow of 1,000 second feet as applied to the elevations which you have used, have you not?

A. This Exhibit #116 recognizes this low water elevation.

1100 Q. Let me ask it this way; isn't it true your Exhibit #116, which you have just testified is based upon elevations of low water of 1879, is platted with a low water flow of 1,000 second feet at those gage heights?

A. Yes, sir, approximately.

Q. Will you look at Exhibit #117-a and tell me whether it is not true that the curves or open river flow at Lock #2 lower pool and Lock #3 lower pool, are likewise platted on those same gage heights, with a low water flow of 1,000 second feet?

A. Yes, sir.

Q. And isn't it true as to all your Exhibits Nos. 117-a to 117-f, inclusive, so far as they relate to these locks on the Kanawha, that they are platted on the gage heights of the low water of 1879, with an assumed low water flow of 1,000 second feet?

A. Yes, sir, with respect to the mouth of the river. I am not certain it is 1879 low water.

Q. At the mouth of the Kanawha?

A. Yes, sir.

Q. Otherwise the answer would be yes?

A. Yes, sir.

Q. I want to direct your attention to Water Supply Paper No. 536, page 85, the second column, and ask you to tell me what was the low water average daily flow of the Kanawha River, at Kanawha Falls, in 1879?

A. This give 1,540 second-feet for that year.

Q. For 1879?

A. Yes, sir, it gives another flow, a lower flow for another year.

Q. Quite so. But the low water flow for 1879, according to the Water Supply Paper #536 was 1,540 feet?

A. Yes, sir.

1101 By Mr. GATCHELL:

Q. Will you read that?

A. This table says "Monthly discharge of Kanawha River at Kanawha Falls for the years 1877 to 1916."

By Mr. JACKSON:

Q. And doesn't the table show one column giving the minimum discharge?

A. Yes, sir.

Q. And you have stated that was 1,540 feet, according to this for 1879?

A. Yes, sir.

Q. You have complete confidence in the Water Supply papers, haven't you, as an engineer?

A. That is a mean daily discharge.

Q. But it was the lowest average flow for the low water 1879?

A. Lowest average day.

Q. Then is it not a fact that the low water flow which corresponds with the gage heights of 1879 was 1,540 second-feet?

A. That is the lowest daily average, according to that.

Q. In 1879 what would have caused the minimum average flow to drop to some unknown point and rise again so as to give an average of 1,540 second-feet?

A. The flow fluctuates somewhat.

Q. During low waters does it fluctuate?

A. Yes, sir.

Q. Pretty rapidly?

A. I have known it to fluctuate rapidy at Kanawha Falls.

Q. After what time was that?

A. In 1930 or 1931 the lowest point on the recordagraph showed a minimum flow of something like 841 second-feet, while the daily average was something higher than that.

Q. How much higher?

1102 A. I don't remember.

Q. What was the cause of that fluctuation if you know?

A. I don't know. It was reported to me the operation of the Glen Farris plant.

Q. The Glen Farris plant didn't have any effect in 1879?

A. No, sir.

Q. No plants on the river then?

A. No, sir.

Q. No dams on the river in 1879?

A. No, sir; I don't think so.

Q. Can you suggest anything else that might have caused some fluctuations in the low water flow for the lowest day of 1879, under conditions that prevailed at that time?

A. No, sir; I don't know.

Q. This minimum average daily flow of 1,540 second-feet in 1879, was at Kanawha Falls—the probability is the flow farther down would be larger, isn't it?

A. The probability is it would be larger, but not necessarily.

Q. But you would think as an engineer the balance of probability was on the side of it being larger? In 1879.

A. Yes, sir.

Q. Is that your judgment that is what probably happened from your studies?

A. I will say it was possible.

Q. How far is Kanawha Falls from Lock #2, roughly?

A. About ten miles, I believe.

Q. Would you think it might lose one-third of its water between Kanawha Falls and Lock #2, under 1879 conditions?

A. I wouldn't think so.

Q. I direct your attention to Exhibit 117-a a moment. There appears on that exhibit a straight line, labeled, "Lock

1103 #3 normal upper pool elevation 584.5." Is the upper pool for Lock #3 the same as the lower pool for Lock #2?

A. Yes, sir.

Q. There also appears on that chart another straight line, "Lock #2 normal lower pool elevation 591.57." There appears to be a difference. It is something over five feet between the elevation given for the normal upper pool elevation of Lock #3 and the lower pool elevation of Lock #2. Can you explain that discrepancy?

A. The upper pool for Lock #3 is 591.57.

Q. That is the normal upper pool?

A. For Lock #3.

Q. Is this an error in your Exhibit 117-a?

A. It appears to be an error.

Q. That is this line "Lock #3, normal upper pool elevation 584.5" should read 591.57, is that right?

A. Yes, sir.

Q. I don't want to take time to go through all these curves Mr. Teeter, so as a matter of illustration, will you tell me as briefly as you can, how the curve entitled "Lock #2, Lower Pool," was developed?

A. Lock #2 Lower Pool?

Q. Particularly the open river branch of the curve.

A. Lock #2, Lower Pool, would be, according to the lower gage at Lock #2 while Dam #3 was operating. This open river would mean without Dam #3 in, and we have the elevation of zero flow according to the surveys and we have the elevation of low water according to the surveys.

Q. That is the same elevation we have been talking about in connection with low water of 1879?

A. Yes, sir; and with those two points the curve is run in to join the curve made with Lock #3 operating.

1104 Q. Were those gage readings and ratings which you used affected by leakage in Lock #2 or Dam #2?

A. This was for the lower gage at Dam #2. It is not affected materially by the leakage through Dam #2.

Q. It would be affected by leakage through Dam #3?

A. Only unless it changed the elevation at Dam #3.

Q. Now, Mr. Teeter, you have already testified that these open river curves such as the lower branch of the curve marked "Lock #2 Lower Pool, open river," are obtained by taking zero and then platting on the gage heights obtained from the low water of 1879, a point of 1,000 second-feet, is that right?

A. Yes, sir.

Q. Now, if you had platted with the gage heights for the low water of 1879 the average minimum flow low water flow for any day in 1879, what effect would it have on that curve?

A. It wouldn't have much effect on it.

Q. It would shift your point, for instance connecting with the line marked elevation 589.86 very substantially to the right, wouldn't it?

A. You can see one of the smallest divisions in 200 second-feet.

Q. It would shove it over fifty percent to the right than it now is, measuring from the left-hand side of the chart, wouldn't it?

A. If it was 1,500 second-feet instead of 1,000.

Q. It would shove it over fifty percent farther than it now is?

A. Yes, sir.

Q. And that would affect the shape of your entire curve for open river flow, wouldn't it?

A. It would only affect the shape of it near that point.

1105 Q. Isn't that the controlling point, and the only controlling point you have between your zero and the point where you have connected it with the line of Lock #2 Lower pool?

A. That is the most important control.

Q. It is the only controlling point, isn't it?

A. Yes, sir.

Q. And, therefore, it would entirely control the shape of that lower curve from your zero over to the point of junction with the upper line, wouldn't it?

A. It would change it somewhat according to the difference in flow at that elevation.

Q. Isn't the same thing true for every one of your open river curves on each of these Exhibits #117–a to 117–f, inclusive, on Kanawha River locks, and not the Ohio, of course?

A. I could not say. I have no proof the low water was not 1,000 second-feet.

Q. You have no proof the low water flow was 1,000 second-feet for the gage heights you have used for the low water of 1879, have you?

A. No, sir.

Q. And if it be a fact that the low water corresponds with those gage heights as indicated in the Water Supply paper I showed you, 1,540 second-feet, then it would affect every one of the open river curves dealing with the Kanawha River shown on your Exhibits 117–a to 117–f, the same way you have indicated in your testimony as to lock #2, lower pool?

A. Yes, sir; however low water flow on this standard chart of the Huntington office states low water 1,000 second-feet.

Q. You don't know it was 1,000 second-feet down at the mouth of the Kanawha for 1879?

A. No, sir.

1106 Q. Do you know when this figure of 1,000 second-feet was first put on the sheet in the Huntington office?

A. Put on when the chart was made, I think some years ago.

Q. I show you a chart from the Huntington office bearing the stamp "U. S. Engineer Office" print made November 28, 1930, and ask you if it isn't true that chart does not show a low-water flow of 1,000 second-feet?

A. I don't see it labeled 1,000 second-feet.

Q. So at that time your charts didn't show any indication of low water flow of 1,000 second-feet?

A. That chart doesn't.

Q. Doesn't the chart I have shown you contain the same data, fundamental data, that is mentioned in Plaintiff's Exhibit #118?

By Mr. GATCHELL. Q. Would you be able to answer that question without an examination of the chart?

By Mr. JACKSON:

Q. He can say.

A. This print you handed me has no official title on it.

By Mr. JACKSON. Q. I did not ask you the official title. I asked you whether or not the chart I showed you does not show the same basis of data as Exhibit 118?

By Mr. GATCHELL: If Your Honor please, I have been letting this examination go along but if he wants an answer to that question the witness ought to be allowed an opportunity to carefully examine the chart. Just to hand the witness a chart and then take it back right away does not give him an opportuhity to answer the question, and I do not see how the witness can tell whether that is the same data without a careful examination of the chart.

By the COURT:

The witness looked at the chart and said "I cannot tell without a further examination." Possibly he can tell by glancing at it.

I don't know. I don't know the nature of the chart or the
1107 amount of examination that it requires for him to answer the question.

A. I cannot tell it is the same profile without examining it from one end to the other.

By Mr. JACKSON:

Q. Mr. Teeter, in your examination on yesterday I understood you to testify that your rating curve for dams lower down the Kanawha—the old dams I am talking about now—are in most instances based upon computations made from rating curve for lock or dam 2, is that right?

A. For Kanawha Falls?

Q. Kanawha Falls, I should have said.

A. Rating curves at Kanawha Falls and Locks 8 and 9.

Q. The rating curves at Locks 8 and 9, were derived by the use of data from Kanawha Falls, were they not?

A. Only for a very low water.

1108. By Mr. JACKSON:

Q. Now to dispose of one point generally, Mr. Teeter, will you state which rating curves on your Exhibits 117F to 117S, inclusive, were based on actual concurrent measurements of both gauge heights and stream flow at the places, and under the condi-

tions shown on the chart. If you will just read the curves and answer that question?

A. Lock #2, Lock #5——

Q. (Interrupting.) What exhibit are you referring to now?

A. Those are the Locks. I can read from the Exhibit, Lock 2, on 117A.

Q. You mean Lock #2, lower pool?

A. Upper pool.

Q. Where is your Lock #2, Upper Pool, on 117A?

A. Lock #2, and Upper Pool is not on here, but there was a curve for that.

Q. But I am asking you to tell me the curves shown on your exhibit? Can you tell which of those curves, just reading the title briefly, and designating the exhibit, which of those curves are based on concurrent measurements of both gauge heights and stream flow at the places and under the conditions shown on the chart, or according to your exhibits 117A to 117S. Is there any on Exhibit 117A?

A. There is none on Exhibit 117A.

Q. Is there any on Exhibit 117B?

A. Lock #5, open river.

Q. Lock #5, open river, that was based on measurements made at Kanawha Falls, was it not?

A. Several measurements were made on the Kanawha River for Lock #5.

Q. You did not testify that this reading was made from measurements at Lock #5?

1109 A. They were based on those measurements.

Q. Didn't you testify on your direct examination that it was based on measurements at Kanawha Falls?

A. Not entirely.

Q. Partly at least, was it not?

A. It was supposed to check with the Kanawha Falls flow.

Q. Which one checked with the Kanawha Falls, open river, or the other?

A. Both.

Q. Based on simultaneous gauge heights and stream flow measurements?

A. Based on simultaneous flows at Kanawha Falls and Lock #5.

Q. When did you observe open river flow at Lock #5, or low water flow of 1,000 second-feet?

A. 1,000 second-feet was not measured.

Q. There is not a point on that open river curve that was the result of concurrent gauge reading and stream flow measurements at Lock #5, is there?

A. Yes, sir.

Q. Which one is it?

A. Lock #5, open river, is based on stream measurements, I will say all of it.

Q. You will say all of it now?

A. Yes, sir; from 1,000 second-feet up.

Q. You had some measurements between thousand second-feet at the same point?

A. Yes, sir.

Q. How did the dam happen to be down?

A. This was for the gauge below Lock #5, when No. 6 was down.

Q. How did that happen to be down?

1110 A. It was not down at a thousand second-feet.

Q. And it was not down at flows substantially higher, was it?

A. No; it would be with dam No. 6 up.

Q. Then it would not be open river, would it?

A. No, sir; not below 10,000 second-feet.

Q. The only measurements there related to the upper branch?

A. Yes, sir.

Q. Tell me whether there are any on Exhibit 117C—answering the question I asked you before?

A. This additional curve on 117B, Marmet with pool #6, is based on lock #5 curves which is based on stream flow measurements above 10,000 second-feet.

Q. It is not based on the measurements at the place actually shown, on the curve, Marmet with Pool #6?

A. Not actually.

Q. Now keeping in mind the question I asked you, will you tell me of any curves on 117C that answer that definition?

A. Lock #8.

Q. Do you mean to testify that Lock #8 is based upon concurrent measurements of gauge heights and stream flow at Lock #8?

A. Yes, sir.

Q. And when were they made?

A. At various times since 1930.

Q. Is that true of both branches of the curve?

A. For open river and the upper branch on Lock #8 curve and the lower branch when Lock #9 was down.

Q. When was Lock #9 down, or Dam #9?

A. It was down when the flow was at such a stage that it went down.

Q. It would not be down at any of the lower flows?

A. No, sir.

1111 Q. And it would not be down for any of the lower branches of that curve, would it?

A. Possibly around 12,000 second-feet.

Q. It might go down at 12,000 second-feet?

A. Yes, sir.

Q. Didn't you testify on yesterday on your direct examination that the upper branch of that curve was estimated?

A. No, sir. There is a certain amount of estimation in this case, because it is necessary to know elevations at Lock #9 below in order to determine the flow at #8.

Q. On your direct testimony on yesterday I asked you the following question and you gave the following answer: (P. 2273) "Q. Can you tell me the data from which you obtained the rating curve, Lock #8?

"A. This curve was prepared by plotting gauge readings for #8 for the flow of Kanawha Falls, increased according to the drainage area.

"Q. And did you have any actual measurements for #8?

"A. We have a few measurements at Lock #8 which we used to check the curve." Was that an accurate statement?

A. Yes, sir.

Q. Is there any other curve on Exhibit 117C?

A. No, sir; not on Exhibit 117C.

Q. Is there any curve on 117D that answers the condition of reflecting concur ent gauge readings and stream measurements at the places shown on your curve?

A. Curve for Winfield site.

Q. Does that reflect conditions for all flows on the Ohio, corresponding to the given flows of the Kanawha on the exhibit?

A. Probably not.

Q. It is merely an average, isn't it?

1112 A. Yes, sir.

Q. It would never occur unless it was by accident?

A. It is an average condition very likely to occur according to this curve than otherwise, if that is the average.

Q. There can be very wide departures, of course?

A. Yes, sir.

Q. Now tell me what is the fact about curves on Exhibit 117E. Were they made on actual concurrent measurements of both gauge heights and stream flow at the places and under the conditions shown on the exhibit?

A. No measurements made at 10 and 11 to check these curves.

Q. Referring to Exhibit 117F, are they estimated curves?

A. We have a rating curve for this site on Ohio and Kanawha Rivers which is based upon concurrent meter measurements in the Ohio River.

Q. Is that curve based on concurrent gauge readings and at the places indicated?

A. Open river curve below is based on concurrent meter measurements.

Q. How did the dam happen to be down at those places?

A. That is based on meter measurements when the dam was not down.

Q. That condition did not prevail for the curve open river on the lower water end, did it?

A. No, sir.

Q. So that is all estimated. Is that right?

A. We have a curve for Gallipolis site, which is just below #26 which was used to check this curve.

Q. That was derived from what?

A. From measurements during Ohio River, open river stage.

Q. That was a relatively high stage of the river?

1113 A. It is from 40,000 second-feet or higher. Of course, we have low water on the Ohio River, also zero flow for those points.

Q. Referring to Exhibit 117F where you show lines of low water mile 266, elevation 514.5, what is your authority for that?

A. That is taken from the Ohio River Chart, low water at 266.

Q. What year was that, so that we can identify it?

A. You mean what year was the low water?

Q. Yes, sir.

A. I don't know.

Q. That shows low water flow on your chart of 3,000 second-feet, does it not?

A. A little less than 3,000 second-feet, I would say.

Q. Will you please furnish us with the date of this gauge reading and the date this low flow applied, will you please furnish us the date of each of those?

A. That low flow is given on the elevations on the Ohio River chart.

Q. But I want to get the basis of the data. I will ask you to furnish it, not now, but later, the date for which that flow and elevation occurred. Will you do that?

A. If possible.

Q. On your Exhibit 117D, which I want to refer to for a moment, your curve of the Winfield site, average open river, how many measurements did you have under that condition?

A. I don't know how many measurements, 15 or 20 I would say.

Q. Were they all taken at the Winfield site?

A. They were taken at the site of No. 8 which is just above Winfield.

1114 Q. How far?

A. Three or four miles, I believe, I don't know exactly.

Q. Now, Mr. Teeter, I want a little more information about Exhibit 117B. Your curve entitled "Marmet with Winfield Dam in place" appears to show a leakage of 700 second-feet. Is that approximately right?

A. Yes—not exactly either—it shows that the pool would go down.

Q. Why would it go down?

A. It might go down by use of water out of the pool.

Q. Was this curve drawn to reflect the condition of use of water out of the pool, or what?

A. Probable condition at that low flow.

Q. What use of the water out of the pool was contemplated?

A. This is a pool past Charleston—for all industrial uses of water out of the pool.

Q. Do you understand that that drop in the point of curve is intended to reflect use of water for industrial purposes?

A. It is intended to reflect that the pool was going down when the inflow was 700 second-feet or less.

Q. Do you know of any industrial use down on that river or water that does not return the water to the same pool?

A. There is considerable water used, but I don't know the amount returned.

Q. Do you know of any that does not return, or such water as it does return to the same pool?

A. I don't know of any that does return all of this water.

Q. You understood my question, didn't you?

A. I don't know how much they use out of the river.

Q. I am not asking you that, but I am asking you if the Industrial water, or if the water used by industries, if they do not return the water, whatever is returned to the same pool?

A. They return whatever is returned, to the same pool, yes.

1115 Q. Did you make the estimate of 700 second-feet?

A. That is just an estimate, not based on any physical data of the use of the water.

Q. Do you know that it was based upon the idea of the use of the water at all?

A. Yes, sir.

Q. Did you actually make the estimate?

A. I made that curve.

Q. But did you make an estimate?

A. That is not based on a numerical estimate, but just an estimate when the pool was going down, or when the flow decreased.

Q. What I am trying to get at is this, why you show 700 second-feet, if you did show it?

A. I estimate that it starts lowering at that flow.

Q. But you had no data upon which to base that?

A. No, sir.

Q. What would be the leakage at the Winfield Dam. Have you made any estim. of that?

A. The dam has not been built yet: I don't know.

Q. You made an estimate of the condition of the pool without the dam being built, and I wondered if you had not made an estimate of the leakage?

A. No, sir.

Q. Did your 700 second-feet include any estimate for leakage?

A. Yes, sir.

Q. How much?

A. Estimate when the pool would go down at 700 second-feet but no estimate of how much of that would be leakage and how much would be other uses, &c.

Q. With Marmet and Winfield dam in place is a computed curve necessary?

1116 A. Yes, sir.

Q. Isn't it a fact that you have drawn a curve, showing backwater effect of Winfield dam on Marmet lower pool, which curve shows this backwater effect disappearing at a flow of 7,200 second-feet?

A. Yes, sir, 7,200 second-feet.

Q. Do you believe that is correct?

A. Yes, sir.

Q. Isn't it a fact that it would not be possible for the effect of Winfield Dam on the Marmet lower pool to disappear with a flow of less than well over 100,000 second-feet?

A. It would be possible for the effect to disappear at 7,200 second-feet.

Q. How—explain that?

A. The dam raises the water to pool stage during low flow. At a flow approximately of 75,000 second-feet, the dam will be open.

Q. 75,000 you say?

A. 7,000—no; 75,000. You are right.

Q. But you have platted 7,000 instead of 75,000, haven't you?

A. Under ordinary operation of Winfield dam, that curve will probably go higher than 7,000.

Q. It would go very much higher, would it not?

A. I think it would.

Q. In your judgment, it would go around 75,000 second-feet, would it not?

A. I would say 50,000.

Q. And the connecting point between that curve and the upper branch or curve, would be well off your chart?

A. Yes, sir.

Q. It runs to only 30,000 second-feet?

1117 A. Yes, sir.

Q. Doesn't that show you as an Engineer that this curve for open river, lower branch or curve rather, for Marmet with Winfield dam in place, lower branch, is necessarily an error?

A. Yes, sir; it is.

Q. On this exhibit, referring to the upper branch of curve Marmet with Winfield dam in place, how did you determine how low the end of that curve would go?

A. You mean the zero flow?

Q. The upper branch curve I am talking about.

A. The upper branch Marmet with Winfield in place?

Q. Yes, sir.

A. It goes to below 566 at zero. That is an estimate.

Q. How much is that in feet?

A. As shown here, that is about three-tenths of a foot.

Q. That is an estimate of the variation in the pool?

A. Yes, sir.

Q. Now I want to direct your attention to this chart, and also direct your attention to lower branch of the curve, Marmet with Winfield Dam in place, that is, the branch for open river flow and also lower branch curve, entitled "Marmet 1935," with Pool #6 in place, open river flow, and will ask you whether the branches of the two curves described do not both represent Marmet lower pool with open river conditions?

A. Yes, sir.

Q. I will ask you to explain why the two curves representing Marmet lower pool with open river conditions, do not coincide for the same flow?

A. They are platted on here according to gauge readings and not according to elevation.

Q. This is the same river and the same flow, isn't it?

1118 A. Yes; but the gauges at the two points is different.

Q. It is at the same place?

A. It is.

Q. And platted at the same place, isn't it?

A. Marmet with pool #6, has a lower pool below it than the Winfield pool.

Q. Does that make any difference of open river flow?

A. I was looking to see if the same gauge was used to apply to those curves.

Q. The elevations for Marmet dam are given on the left-hand side, same elevations for both curves?

A. I would say the reason those curves are different is because there is a condition of operation of the two dams, they do

not change from pool to open pool and at times part of the dam is down and part is up.

Q. Do not your curves for open river flow mean open river flow and mean the same in both instances?

A. The dam might not all be down in open river.

Q. Then it would not be open river flow, would it?

A. Not strictly.

Q. It would not be open river flow either if part of the dam was up?

A. Part of the dam might be up and it would not affect the flow up at Marmet.

Q. Then if the part of the dam that is up does not affect the flow it is open river condition?

A. Yes, sir.

Q. And if both curves represent open river conditions they should coincide for the same flow, should they not, at the same place on the river?

A. They show a difference of about a foot there.

1119 Q. They should coincide, should they not?

A. They should.

Q. You have already said that on your upper curve, Marmet with Winfield dam in place, that the curve for open river flow shows back water effect terminated at 7,000, instead of 75,000 second-feet? Would not that change in your lower curve change the shape of your upper branch of that curve?

A. That would extend up further, too.

Q. Just as a matter of information, there is one line here which says "Marmet, 1935, with Pool #6." Is there any significance to that date, 1935?

A. No 6 was in existence in 1935 and that is just a date showing that.

Q. Then there is no particular significance in that, and it does not modify the conditions, Marmet with Winfield in place, in any fashion?

A. No, sir.

Q. You will notice that your curve, Marmet, 1935, with Pool #6 in place, drops below the normal pool level. Is that leakage?

A. Yes, sir.

Q. What is the significance of the vertical ordinate 0.4 at the end of the curve—or 0.3 or whatever it is?

A. 0.3 below the pool?

Q. Yes, sir.

A. The dam would certainly go down—the pool would go down in flow, decreased below 1,000 second-feet, probably more than 0.3; that is, a continuation of zero.

Q. Do you know whether or not it goes below 0.3?

A. I would have to look at the gauge readings to see.

1120 Q. You are able to say it does, can't you, from your familiarity with this work on the river?

A. I would say it does; yes, sir.

Q. Well, now, I direct your attention to the curve Marmet 1935, with pool in place, and ask you to say whether or not that does not show the backwater effect of dam No. 6 disappearing at less than—a flow of less than 1,000 second-feet?

A. That is not quite right. With open river curve—the curve should extend to 10,000 second-feet.

It would certainly not disappear in less than 10,000 second-feet?

A. No, sir.

Q. And the upper curve—the lower branch of upper curve Marmet, with Winfield dam in place, should follow the lower branch of the lower curve?

A. Yes, sir.

Q. Exactly?

A. Yes, sir.

Q. Look at curves, Lock 5, open river, and 4, open river, at the extreme left hand and tell me what the drop in these curves below normal pool level means?

A. They were extended to zero if the flow was zero, the pool would go down. I cannot state the amount.

Q. You don't know how much?

A. No, sir; the flow never was zero.

Q. You do know that with greater flows than zero, the pools have been below the elevation as shown on your chart?

A. Yes, sir.

Q. Tell me why, on Exhibit 117-a, you assume no leakage on your curves for Lock No. 2, lower pool and Lock No. 3, lower pool?

A. There would be leakage.

1121 Q. There are none shown on the exhibits?

A. No, sir; there are none shown on the exhibits.

Q. That is an error in the curve, is it?

A. I think so.

Q. On your top curve London old lock, I believe you have 2,000 feet leakage?

A. Yes, sir.

Q. How far did this pool drop—how many feet?

A. I don't know; it must drop at times more than this.

Q. More than your chart?

A. Yes, sir.

Q. How much is shown on your chart?

A. About 0.6.

In the same way, tell about the curves on Exhibit 117–c, for
s 6, 7, and 8, lower pools, and in each instance, why did you
how leakage on these curves?
I don't know—there would be leakage; in fact all of these
s are indefinite below 1,000 second-feet.
The curves are in error to the extent that they don't show
ge, are they not?
Yes; they should show leakage.
Will you turn to Exhibit No. 117–d, and tell me how, if at
allipolis dam enters into the situation shown by the curves?
The curves at Winfield lower pool will be affected by the
tion of the Gallipolis dam.
Is that the only curve that is affected?
That is the only curve that is affected by Gallipolis.
When Gallipolis dam is in operation, lock 9 will be out?
Yes, sir.
Will you tell me whether or not I am right in understanding
your upper curve on Exhibit 117–d shows the backwater
of Gallipolis dam disappearing at flow 21,000 second-feet,
or thereabouts?
Q. That is approximately right.
Q. And do you not know it to be a fact that the back-
effect of Gallipolis dam would not disappear at a flow of
han 150,000 second-feet?
Gallipolis dam would not affect flows of 150,000 second-feet
anawha River.
It will affect flows very much larger than 21,000 second-

Not on average conditions.
You think it will not. Are you sure about that?
That is according to our studies. That is, for Kanawha
, which is only 25 percent of flow past the Gallipolis dam.
What allowance did you make for the Ohio River back-
—the variations of the Ohio River flows for a given flow on
Kanawha, in connection with the curve?
This curve represents the Kanawha's portion of water pass-
allipolis.
It gave no effect to any backwater effect of the Ohio River
or the variations of your Ohio River flow?
It considers the Ohio River flow backwater to the mouth of
Kanawha and the Kanawha's portion with backwater to
ield.
That is only on the basis of minimum elevation?
Yes, sir.
What is the minimum elevation?

A. When the Ohio is in flood, the flow below Winfield can be raised by the Ohio River flood higher than this elevation.

Q. Can it be true, even in low water?

A. Not in low water in the Ohio. It can be true of low water in the Kanawha.

Q. Yes. This scale is water in the Kanawha River?

A. Yes, sir.

1123 Q. And, of course, the lower end of this scale does not show anything about flood conditions?

A. No, sir; it is purported to show flow in Kanawha River, as stated down there, with a proportionate amount in the Ohio River.

Q. That is the average; of course, you cannot be certain it will prevail on any particular——

A. (Interrupting.) On any particular date; no, sir.

Q. I neglected to ask you, in connection with Exhibit 117–a—why you don't show the curve London lower pool, with Marmet in place, dropping below the elevation 590, under any circumstances where Winfield was shown to drop?

A. Winfield pool on map 117–d does not go below pool elevation either.

Q. Why, when 117–b——

A. "D."

Q. Isn't it on 117–b?

A. That is true from our map on 117–b.

Q. It is the drop at the Winfield dam?

A. Yes, sir.

Q. Why didn't you show any drop on Exhibit 117–a, London lower pool, with Marmet in place—any drop at Marmet dam?

A. There is no particular reason; if the flow in the river would go below 1,000 second-feet, the pools would drop, in my opinion.

Q. Give your reason.

A. I think it would take 1,000 second-feet in Kanawha River to maintain the pool, less evaporation, leakage, lockage, and so forth.

Q. At Marmet dam?

A. Yes, sir.

Q. What is leakage at Marmet dam?

A. The leakage itself is not material.

1124 Q. Isn't it negligible?

A. It has a negligible effect to a 1,000 second-foot flow.

Q. Yes; do you remember your Exhibit No. 143—what it was?

A. No, sir; I do not. [Mr. Gatchell hands papers to witness.] It is not No. 143—it does not seem to be numbered here, but I presume this is the one.

Q. It is numbered on the back, I think. Isn't it?

A. (Witness examines paper.) Yes, sir; it is number 143.

Q. That shows what kind of curves?

A. That shows stage curves for gauge elevation?

Q. Yes. Well, are those curves shown on your Exhibit 143 in any way based upon the rating curves shown in Exhibits 117-a to f, inclusive.

A. This Exhibit 143 does not show stream discharge.

Q. No discharge at all.

A. Therefore, it is not based on rating curves.

Q. I would like to get that correct—there are no discharges on there at all?

A. I don't see any.

Q. I direct your attention to this citation, on page 2284, of the record, Mr. Teeter, in which you give the official number of the 308 report, referred to in your exhibit as House Document No. 91, 71st Congress, 1st session.

A. It should be 74th Congress.

Q. Otherwise, it is accurate?

A. Yes, sir; it is the 74th Congress, the 91st House Document. Doesn't that correspond with the statement on the document itself?

Q. I think it does. This was noted to be an error.

A. I noticed that yesterday myself.

Q. What is your official title, Mr. Teeter?

A. My official title is Associate Hydroelectrical Engineer.

Q. What is your duties?

1125 A. I am head of a subdivision in our office, engaged in hydroelectric studies, reports, and stream gauging.

Q. You work under—your direct superior is Mr. Winn, who testified here?

A. Yes, sir.

Q. Wasn't this work all done under his direction?

A. His supervision and direction.

Q. And then, what did you mean when you said that it was done under your direction?

A. I had immediate charge of the work.

Q. You had some other people who were actually doing the work and you were in charge intermediately between them and Mr. Winn?

A. Yes, sir.

Q. Under whom did you work in 1931?

A. I worked in 1931 under Mr. Burns.

(Exhibit 514, being letter dated Oct. 20, 1931, from F. B. Duis to F. W. Scheidenhelm, was marked for identification.)

Q. Do you know Mr. F. D. Duis?

A. Yes, sir.

Q. He is connected with the Huntington office?

A. Not at the present time.

Q. Was he in 1931?
A. Yes, sir.
Q. He was the principal engineer?
A He was the principal engineer.

By Mr. JACKSON. If Your Honor please, I ask leave and the consent of the Court to make this witness my own for the purpose of identifying this signature, as a matter of convenience and out of order.

By the COURT. All right.

By Mr. JACKSON:

Q. Mr. Teeter, please examine the signature on Exhibit 514, filed for identification by the Defendant, which purports to be that of Mr. Duis, principal engineer, and state whether or
1126 not you can identify that signature?

A. (The witness makes inaudible remark to Government counsel.)

By Mr. JACKSON. Let the records show that the witness asks Counsel for the Government if it was legal for him to identify the signature; and let the record also show that I said to him that he must answer the question, if it is proper.

By the WITNESS. It appears to be his signature.

By the COURT. You have a well-trained set of witnesses.

By Mr. JACKSON:

Q. That appears to be his signature, does it?
A. Yes, sir.
Q. Have you any doubt about it?
1127 A. Well, I didn't see him write it.
Q. Have you seen his signature?
A. Yes, sir.
Q. And you say it is his?
A. I would say that is his signature, but I cannot prove it.
A. I think that is all.

Redirect examination by Mr. GATCHELL:

(Exhibit 145, being House Document 91, 74th Congress, First Session, 1935, was offered in evidence.)

Q. I want to ask this witness again, if the low water flows shown on these rating curves were low water flow elevations given at the United States District Engineer's office at Huntington, West Virginia, on the official charts that were in the office?
A. Yes, sir.
Q. And was a flow assumed at these elevations of 1,000 second-feet?
A. Yes, sir.

Q. Did you make a special study of flows on New River, other than as shown on the charts which you have identified and testified to?

A. I believe not.

Q. I ask you, in response to a question by opposing counsel with respect to the difference in flows as shown by the Geological Survey records, at Eggleston, October 26, 1921, and at Kanawha Falls, on October 29th, 1921, in which a lower flow as shown to be recorded at Kanawha Falls—if that could have been caused by any ponding of the water above Kanawha Falls?

A. Yes, sir; it could.

Q. And where would that pond have been located, if you know?

A. That is immediately above Kanawha Falls.

1128 Q. Where is the gage located at Kanawha Falls?

A. The gage is located below the Falls—the official gage.

Q. Was the gage below Kanawha Falls likely to register a lower stream flow than any one of the gages above Kanawha Falls?

A. Yes, sir; that is entirely possible, as I said before.

Q. Do you know the lag between the recording at Eggleston and at Kanawha Falls?

A. Not definitely; it must be during low water flow a day and a half or two days.

Q. You have testified as to the accuracy of the stream flow record—the methods of making current measurements by means of current meters. Would you mind describing completely to the Court just exactly the methods that you used in your office in making current meter measurements?

A. The current meter measurements were made by the United States Engineer's Office on the Kanawha River.

By Mr. GATCHELL. Q. Describe the method of making these current meter measurements?

By Mr. JACKSON:

Q. Were these the measurements used in making these charts, or did you use U. S. G. S. measurements?

A. The charts on New River referred to U. S. G. S. measurements on New River. The discharge measurements on Kanawha River below Kanawha Falls are based on discharge measurements made by the United States Engineer's Office.

By Mr. GATCHELL:

Q. Describe to the Court the method of making current meter measurements on Kanawha River?

A. I will describe the method of making current meter measurements at the upper bridge in Charleston, as an example:

During low water, we make soundings across the river to establish the river bottom—profile—that is plotted as a
1129 standard section. Of course, the river bottom is fairly smooth above and below this point—likewise the river banks. Of course, on the profile of these cross sections, we see the changes in the river bottom and designate points of measurements under that section, so that each measurement will give us the average velocity in that particular section. The stationings and the cross sections are marked on the bridge, with the current meter dropped off the bridge, we know exactly the location of the meter measurements and we know the river bottom elevations, but the meter is first dropped to the bottom—the depth checked, and with a gage on the river, and the recorded depth and gage elevation, we know the depth at which to make our measurements. The current meter is dropped in the water with sufficient weight to hold it in place—the velocity of the current turns the current wheel, which is standardized and, according to the number of revolutions, the velocity is determined. That is the procedure across the river with the data recorded, and with this data, the area of each section of water is known—the average velocity is obtained from the current meter notes; the velocity times the area of each section gives the flow in second-feet, the velocity having been given in feet per second. By summing up this data for the total cross section, the discharge in the river is determined in cubic feet per second.

By Mr. GATCHELL:

Q. I show you Government's Exhibit 116, Kanawha River profile, backwater studies, and ask you what part the curve showing low water flow played in the computations shown on this chart?

A. The low water flow chart had no effect upon the results shown on this chart.

1130 Q. I show you Government's Exhibit No. 118, Kanawha River profile, 6- and 9-foot projects, and ask you what purpose was served by the low water curve shown on this chart, in connection with the other computations shown on that chart?

A. The low water curve as shown on here—it is shown on here as a matter of reference, but it is not of importance in computing discharges of hydroelectrical studies of the operation of the dams.

Recross examination by Mr. JACKSON:

Q. Mr. Teeter, in connection with these discharge measurements at Kanawha Falls and Eggleston, tell me the drainage at Eggleston?

A. I haven't it with me.

Q. I will help you on that. [Exhibiting papers to witness.] Look at page 107 of Water Supply Papers 758, and state whether

or not that shows a drainage of 2,945 square miles, at Eggleston?

A. Yes, sir.

Q. Look at page 111 of the same Water Supply Papers No. 758, and state whether or not that shows the drainage area of Kanawha Falls to be 8,300 square miles?

A. Yes, sir.

Q. It is well over three times as great at Kanawha Falls as at Eggleston?

A. Yes, sir.

By the COURT. Q. Did you say 8,329?

A. I am wrong about that.

By WITNESS. Q. It is not well over three times?

A. I think I am wrong the second time. I had 2,945 on my notes and it is 2,495. I was in error.

By Mr. GATCHELL:

Q. (Addressing the witness.) Will you change your answer?

A. I did not compute it myself.

1131 H. G. GERDES

Direct examination by Mr. THOMPSON:

Q. Mr. Gerdes, will you please state your name to the stenographer?

A. H. G. Gerdes.

Q. Where do you reside?

A. Washington, District of Columbia.

Q. With whom are you connected at this time?

A. With the Federal Power Commission.

Q. Will you please state your education and professional experience?

A. I am a graduate of the University of California in Civil Engineering, degree of Bachelor of Science, a member of the American Society of Civil Engineers, and am a licensed civil engineer under the laws of the State of California. After leaving college I was engaged for a number of years in hydraulic structural design, inspection, cost estimating, and valuation engineering in connection with buildings and other structures, tanks, pipe lines, irrigation and reclamation district dams, levees, canals, power and pumping plants, and on hydroelectric and water utility properties in California and the far west generally. Susequently I was connected with the United States Engineer Department for six years as engineer in charge of navigation, hydraulic and hydroelectric investigation, design, and construction work, including, among other things, a tidal hydraulic survey of San Francisco Bay.

By Mr. JACKSON:

Q. I didn't catch whom that was made for?

A. United States Engineer Department. Also several "308" investigations and reports covering the Mad and Eel River Systems in California, the lay-out and design of Lock and Dam Systems for the improvement of the Willamette River, Oregon, and the San Joaquin River, California. During 1932 and '33 I was in charge of the field investigations and surveys preparatory to construction of the Bonneville Power and Navigation Dam on the Columbia River, Oregon, and later, after the allotment of funds, was engineer in charge of design and responsible
1132 for the preparation of plans and specifications and construction schedule for the $15,000,000 main spillway dam, now over one-half complete. During the past year and a half, I have been a member of the staff of the Bureau of Engineering of the Federal Power Commission on investigation and analyses of hydroelectric projects connected with the administration of the Federal Power Act.

By Mr. THOMPSON:

Q. Under whose direction do you work, Mr. Gerdes?

A. Under the direction of Mr. Roger B. McWhorter, Chief Engineer.

Q. Are you familiar with any part of New River between Wylies Shoals and New River bridge?

A. Yes, sir.

Q. How did you obtain this familiarity?

A. I personally have made an investigation and survey of every shoal of any importance on New River between Wylies Shoals and New River bridge at Radford.

Q. When did you make this survey?

A. Between June 22nd to 29th and July 13th to 15th of this year.

Q. How did you make the survey?

A. By visiting every shoal and rapid on this section of the river, wading into the river and measuring the depths and widths of the principal channels and the current velocity on each shoal.

Q. Did you have any one to assist you?

A. I was assisted by a survey party, consisting of a surveyor, current meter operator, two rodmen, and a chauffeur.

Q. What shoals did you visit?

A. I visited every shoal or ripple along this section of the river and made measurements on 41 shoals in this section of the river.

Q. Were all of these shoals named?

A. Certain of these had names. Others which were unnamed were designated by me with a number and the mile above the

head of the Kanawha River at which they occurred.

Q. The mile above the Kanawha?

1133 A. Yes, sir.

Q. Above the mouth of the New River or above the Kanawha?

A. The two definitions are identical. It was the mile on the New River which was the mile of the New River above the mouth of New River which is the head of the Kanawha.

Q. State whether or not you have given the numbers of these shoals that were unnamed to anyone?

A. I have transmitted them with my report to Mr. McWhorter, Chief Engineer of the Federal Power Commission.

Q. Have you given him any other data which you may have gathered with respect to these shoals?

A. I have given him the information which I procured as to the depth and width of the channels at these shoals and the current velocity of the water at the same points.

Q. Please state whether there are any falls within this area that you have named on New River?

A. There are not. There are no falls on this section of the river.

Q. What do you mean by falls?

A. I mean where the water falls perpendicularly, or almost so, over an obstacle in the channel.

Q. State whether or not there are any falls in the entire New River under that definition?

A. That I cannot state. There are certainly none of this section of the river.

Q. How do you term these places where the water runs swiftly?

A. They are either shoals or what are commonly termed rapids.

Q. What percentage of the river between Wylies Falls and Radford consists of pools?

A. About 85 percent,

Q. Do you know the range of depth of these pools?

1134 A. Yes, sir.

Q. Please state it?

A. They run from three to six feet in depth or even more.

Q. How do you know this?

A. By soundings that I made.

Q. If 85 percent of the river is pools, that would leave 15 percent as shoals, would you have us understand?

A. It would.

Q. What percentage of these shoals had a minimum depth of less than two feet when you examined them?

A. Between two and three percent.

Q. And what was the depth of the remaining 12 or 13 percent?

A. 2 feet or more; that is, the remaining 12 or 13 percent which could be classified as shoal.

Q. What was the condition of the river at the time you investigated it with respect to depth?

A. Well, as I have related, this section of the river consists largely of pools or quietly flowing water with a depth of 3 to 6 feet or even more in spots and the minor part, 15 percent or less, of shoals, all of which have depths over 2 feet with the exception of 2 or 3 percent.

Q. What was the condition of the water as to whether it was mean flow or low flow when you visited it?

A. According to the Geological Survey gaging station reports, taken from stations on this section of the river at Eggleston, Glen Lyn, and Hinton, the river was about at ordinary summer low water. I might say that was confirmed by my own observation.

Q. And you checked it also with the Geological Survey reports?

A. Yes, sir.

Q. Does this include both periods of time? I think that you said that you were on the river two periods of time, didn't you?

1135 A. That is right. This covers both periods of time. If you desire the flows, I may say that during these periods the flow at Hinton ranged from 1,800 to 2,750 second-feet, the flow at Glen Lyn from 1,740 to 2,770 second-feet, and the flow at Eggleston from 1,480 to 2,530 cubic feet per second in each case.

Q. Will you state whether you took any photographs of the shoals at the time you were making the investigation?

A. I did.

Did you take any photographs of other places than the shoals?

A. I did not.

Q. I hand you what purports to be an album of photographs, marked for identification Government Exhibit 146 and ask you if you know what that is?

A. Yes, sir; I do.

Q. What is it?

A. It consists of views, photographs of shoals and rapids on the unimproved section of New River between Wylies Falls, Mile 88.6, and Radford, Mile 146.1, which were taken under my direction during the period July 13 to 15, 1936.

Q. Were you present when these pictures in this album were taken?

A. I was. In fact, I am shown in most of them.

Mr. THOMPSON. I desire to offer that in evidence.

NOTE.—This album was filed and marked Government Exhibit No. 146.

Mr. JACKSON. We object to the comments that have been included under the pictures.

Mr. THOMPSON. I am going to have the witness testify about that. Counsel has been so very strict about my trying to identify before offering in evidence, and I was trying to follow him, but I am going to have him identify each picture.

Mr. JACKSON. The exhibits ought not to have comments put on them if they are to be offered.

Mr. THOMPSON. They might be unintelligible.

The COURT. Comments other than indicating points from which the pictures were taken?

Mr. JACKSON. I just happened to notice the first one—"Boat channel behind island in background." As far as we know there is no boat channel, much less behind island in the background. If they had simply said "Wylies Falls" or anything to indicate where it is, we would not have had any objection to that, but No. 1 is the first one I looked at and it has that comment, and we object to it as being improper on the exhibit. Picture 3 says "View from left bank showing main channel notch."

The COURT. He is going to identify each of these pictures, he said.

Mr. JACKSON. I was only worried about the comments.

By Mr. THOMPSON:

Q. What is this typewritten matter you see on the first page?

A. That is a table of contents and index of the photographs in the album.

Q. Will you please turn to the pictures and identify them in turn?

A. Photograph No. 1 is a picture of Wylies Falls, view taken across the rapids from the left bank with the old boat channel shown behind the island in the background.

By Mr. JACKSON:

Q. Can you point out the place in the picture where the boat channel appears?

A. Approximately in the middle of the picture there is a small island with trees on it and you can see the water going be-
1136 hind the trees at either end of the island. Behind that island with the trees is the boat channel excavated by the United States when this river was under improvement in 1870 to '80.

By Mr. THOMPSON:

Q. Go ahead?

A. Photograph No. 2 shows Wylies shoals, the next point of importance above Wylies Falls. The view is in the middle riffle, photograph taken from the left bank and shows the survey party in midstream measuring the depth, width, and velocity of the principal opening.

Q. Is that the group of men that were working for you?

A. Yes, sir.

Q. What were they doing there?

A. They are measuring the depth and width of the principal channel and the velocity of the current in the center of that opening.

Photograph No. 3 shows an unnamed shoal which I have designated as No. 2. The view was taken from the left bank and shows the main channel notch through the ledge which otherwise partially obstructs the river at this point.

Photograph No. 4 is of the rapid at Shumate's Falls, taken near the upper end of the rapid. The survey party is shown at the far edge of the water in the channel near the right bank.

Photograph No. 5 is taken next upstream at Rich Creek shoals. The view is from the right bank showing the survey party in the upper riffle, again measuring the channel.

No. 6 is of shoal No. 8. The view is from the left bank showing the survey party measuring the channel.

Photograph No. 7 is shoal No. 9. The view is from the left bank showing the survey party. I am not certain whether all of the men are standing within the channel or not. They are
1137 either in it or near it.

Photograph No. 8 is of shoal No. 10, otherwise known as French's Mill Shoal. The view is across the river from the left bank, and shows the principal channel in the foreground. It may be recognized by the relatively smoother water shown on the photograph.

Photograph No. 9 is shoal No. 11. The view is from the left bank and shows the survey party in the river at the lower edge of this shoal.

Q. Where is the channel there, if you can point it out?

A. If I may refer to my notes, I believe that the man in the center of the stream or near the center of the stream is at the edge of the main channel.

Q. Go ahead.

A. Photograph No. 10 is of Shoal No. 12. The view is from the left bank showing the surveyors—in this case the current meter man in the river at the lower riffle of the shoal.

Photograph No. 11 is of Shoal 13. The view is from the left bank looking upstream showing the main channel near the right bank. There is clearly visible in the photograph the smooth sheet of water entering the channel notch.

Photograph No. 12 shows Shoal No. 15 with the survey party at the channel which in this case passes through the upper ledge near the left bank in the immediate foreground.

Photograph No. 13 is of Snidow's Ferry Bar. The view is from the left bank showing the surveyor near or in the channel.

Photograph No. 14 shows Little Stony Creek Bar just below the highway bridge at Pembroke. The view is from the left bank across the lower end of the shoal, showing the survey party in the channel near midstream. At the right edge of the picture is shown the lower edge of the island which divided the river at this point. It can be seen that the main current is in the foreground to the left of the island.

1138 No. 15 is a picture of one of the rapids known as Snidow's Falls. The view is from the left bank and shows the survey party in the channel near midstream at the upper end of the rapid.

Photograph No. 16 is of Upper Sinking Creek Bar. The view is from the left—that is a typographical error. It should be view from the right bank, showing the survey party at the main channel through the ledge near midstream.

Photograph No. 17 is of the Eggleston Shoals, shortly above the highway bridge at Eggleston. The view is from the left bank and shows the survey party at the channel through the ledge near midstream.

Photograph No. 18 is of Shoal No. 23, I believe next upstream, the view from the left bank showing the survey party at the channel across this ledge.

Photograph No. 19 is of Shoal No. 24. The view from the left bank shows a survey party at the channel through the main ledge.

Photograph No. 20 is of Shoal No. 26, the view from the right bank showing the survey party in the river near the main channel.

Photgraph No. 21 is of the Rapids at Big Walker Mountain Falls, showing the channel through the lower ledge with the survey party at the edge.

Photograph No. 22 is of White Thorne Ferry Shoal downstream from White Thorne's Ferry. The view is from the left bank showing the survey party at the main channel through this ledge.

Photograph No. 23 is of Shoal No. 31. The view is from the left bank showing the survey party in the river.

Photograph No. 24 is of Shoal No. 32 at the mouth of Stroubles Creek. The view is from the right bank showing the survey party in the channel.

Photograph No. 25 is of an unnamed shoal which I call No. 39 just below the City of Radford. The view is from the right bank across the river showing the main channel through the ledge near the river bank.

1139 Photograph No. 26 is a view from the river bank across Shoal No. 40 showing the survey party in the channel near midstream.

Photograph No. 27 is of Lower Pepper Falls. The view is from the left bank showing downstream the survey party in the channel through the submerged ledge near midstream.

Photograph No. 28 is of Crab Creek Shoal. The view is from the left bank looking across or along the main ledge showing the survey party in the river and the main channel opening at the right bank.

Photograph No. 29 is of Shoal No. 37, shortly above Crab Creek, the view from the left bank across the submerged ledge and shows the survey party in the river at the edge of the channel.

Q. I hand you marked for identification Government Exhibit #147, being apparently an album of photographs, and ask you what it is?

A. This consists of a series of views of shoals and rapids on the unimproved sections of New River, between Wiley Falls, Mile 88.6, and Radford Mile 146.1, and between Allisonia Mile 173.3, and Austinville Lead Mines, Mile 190.0. Photograph taken June 22 to 29, 1936.

Q. And what is the typewritten matter on the first page?

A. The typewritten matter consists of a table of contents and index of the photographs in this volume.

(Exhibit 147 offered in evidence.)

Q. Were those taken in your presence?

A. They were taken in my presence, under my direction, and in many cases by myself.

Q. Turn to the first page of the photographs. I notice the first photograph is entitled Wiley Shoals from left bank consists of four pictures. How was that taken?

A. That view consists of four pictures put together to form a panorama, photographs taken from the left bank of Wiley's Shoals. There is noticeable on the third photograph from the left an open survey boat used by the U. S. Survey Department.

1140 Q. That is the third picture from the left?

A. Yes, sir.

Q. Will you please describe these pictures pointing out, if you can, the shoals as you go out, or the channel rather?

A. Photograph No. 2 shows shoal #2 from the left bank. The channel unfortunately is in the foreground out of view. In this photograph it is out of view, but it is well shown by one of the photographs in the other album. #3 is a similar panorama showing the rapid at Shumate's Falls looking upstream from the left bank. The principal channel coming downstream starts at the water's edge in the middle photograph to the left of the man standing out in the river. That is the man in the middle distance from about one inch to his left on the photograph the channel comes down several hundred feet toward the view point then turns toward the left and passes downstream past the man standing with his arms outstretched somewhere beneath his arms and then passes in the general direction to the left in the foreground in front of the rocks which are visible, and off to the left of the picture.

Q. You describe this man standing with his arms outstretched, you mean akimbo, or at his hips?

A. Yes, an angle of about 45 degrees downward.

Q. Pass on to Photograph #4.

A. Those photographs, or this panorama, is at East River Shoals, looking downstream from the left bank. The channel here is in the approximate center of the river down running down through the length of the shoals, which start about the second picture from the right and continue onward about to the left margin of the left-hand picture.

Q. Now No. 5.

A. Photograph #6 is of Rich Creek Shoals, looking upstream from left bank. This view shows the left or minor channel in the left foreground, and looking upstream, in the middle distance, two islands.

Q. I only see one island there.

1141 A. Well the channel opening which is visible in the middle of the photograph is between two islands to the left, and right. The main channel passes behind the dense tree growth shown on the left, as well as upstream.

Q. Now Photograph #6.

A. Photograph #6 shows the rapid at Peters Mountain Falls from right bank. The channel is in the immediate foreground, partially concealed by the treetops.

Photograph #7 shows Little Stony Creek Bar at Pembroke Highway Bridge from the left bank. This view is almost identical with another one in the other album.

Photograph #8 is a panorama taken from the right bank showing rapid at Snidow's Falls, main bar from right bank, which consists of three bars, one of which is shown in the right-hand

picture, and there is another shown about on the border line between. The left picture and the second from the left, and the upper riffle as it might be called, is about in the middle of the left-hand picture.

Photograph #9 is a close-up of this upper riffle taken from the left bank. The channel is slightly in front of the two men shown visible standing in the stream.

Photograph #10 is of Lower Sinking Creek Bar taken from the right bank. The men are on the edge of the channel which is in the approximate center of the clear water visible.

Photograph #11 is of Shoal #24, taken from the left bank.

Q. Is that #11 a named shoal?

A. No, sir; that is an unnamed shoal which I numbered.

Photograph #12 is of the Bear Spring Shoal, taken from the right bank.

Q. Where is the channel there?

A. I may add that shoal #24 the channel is near the far side.

Q. This is #12.

1142 A. I referred back to photograph #11 which was of Shoal #24, the channel there is in the background near the right bank of the river. Returning to Photograph #12 Bear Spring Shoal, from the right bank, the channel is in the foreground near the right bank.

Q. Photograph #13 is of Shoal #26 taken from the right bank, where the channel is near the right center.

Photograph #14 is of the lower portion of shoal at Sifford's Falls, looking downstream from the right bank. The channel is near the right bank.

Photograph #15 shows a rodman in the river standing between some of the submerged ledges of Sifford's Falls. These falls, may I add, are one of the most peaceable places on the river.

Photograph #16 is another view of submerged ledges of Sifford's Falls.

Photograph #17 shows one of the ledges at Sifford's Falls, from the right bank.

Photograph #18 is a view looking downstream from the right bank, across some of the submerged ledges at the head of Sifford's Falls, just below McCoy's Ferry.

Photograph #19 is from the left bank of upper Sifford's Shoal, just above McCoy's Ferry, which I have named #29. The survey party are standing on the shoal near the channel, which is between them and the island, shown in the picture.

Photograph #20 is of Shoal #32 from the right bank.

Photograph #21 is a view looking upstream from the left bank showing some of the ledges above Jackson's Ferry, a mile or two below Austinville.

Photograph #22 is a view looking downstream from the same point showing another group of ledges.

Q. Photographs #21 and #22, as I understand it, you did not make any soundings or make measurements?

A. That is correct. I merely made a visual inspection.

1143 Photograph #23 is a view of the rapid at Barnett's Falls, looking upstream from the right bank.

Photograph #24 is really a continuation of the panorama in #23.

Photograph #25 is a view of Radford Shoal #41 taken from the right bank. Here the channel comes up in the foreground near the right bank and passes across the picture in what appears to be the open water.

Photograph #26 is of the rapid at Foster Falls, looking upstream at the right bank from the lower end of the falls.

Q. Where is Foster Falls?

A. On the upper river, about a mile or two perhaps below the highway bridge at Jackson's Ferry which is several miles below Austinville.

#27 is of the rapid, the lower of the two rapids at Foster Falls, looking downstream from the right bank.

Now returning to the section of the right on which I made depth and channel measurements, Photograph #28 is of Crab Creek Shoals taken from the left bank. The channel is in the background of the picture near the right bank.

Returning again to the upper river photograph #29 is of Pine Run ledges from the right bank, which are just above Allisonia.

Going upstream #30 is a view of the shoal near Barren Springs, below Carter's Ferry.

No. 31 is a view of Carter's Ferry ledges looking upstream from the right bank.

Carter's Ferry ledges are located immediately upstream from Carter's Ferry.

Photograph #32 is a panorama showing the upper portion of Baker ledges from the right bank. These ledges are located about a mile below Foster Falls.

Q. Mr. Gerdes, where did you proceed in connection with your assignment of examining the shoals of the nonimproved sections of New River between Hinton, West Virginia, and Radford, Virginia?

1144 A. I went first to Wiley's Shoals, located mile 89.1, above the junction of New River with the Kanawha River, 0.5 miles above Wiley Falls. This shoal is the first one above the section which had been improved for navigation by the United States.

Q. Please state what were the critical depth, width, and current velocity at this point?

A. The soundings were made across Wiley Shoals from a survey boat following the best channel, which was found approximately in midstream. The depth of soundings averaged four feet, with a minimum depth of two feet.

The minimum width of the clear channel between boulders was found to be twenty-four feet.

The current velocity at the minimum section was measured and found to be 1.9 miles per hour.

Q. Please state the next shoal you visited?

A. The next shoal in order upstream is an unnamed shoal at approximately mile 90.8 which I noted as Shoal #2.

Q. Is that Shoal #2 according to the photographs you identified?

A. Yes, sir.

Q. What condition did you encounter there?

A. This shoal consists of a rock ledge extending across the river through which there is a chute or notch 24 feet wide at a point about 100 feet out from the left bank.

The depth of water was found to be 3.0 feet at the near edge, the chute channel being deeper out toward the middle.

Q. What was the current velocity?

A. The current velocity was measured 6 feet out from the side of the notch and found to be 2.8 miles per hour.

Q. What was the maximum?

A. The maximum center velocity was estimated at the same time by comparison as 3.6 miles per hour.

1145 Q. What was the next shoal you visited?

A. An unnamed shoal about ½ mile upstream at mile 91.3, noted as shoal #3.

Q. What conditions did you encounter there. What was the channel width?

A. The channel was 18 feet wide found midstream, with a depth of 2.5 feet or more.

Q. What was the velocity?

A. The current velocity was measured and found to be 2.3 miles per hour.

Q. State the next shoal you visited?

A. The next shoal upstream is Shumate's or Neilly's Falls, a minor rapid, located at mile 92.8 which was noted as shoal #4.

Q. What is the drop of the river at Shumate's Falls?

A. At Shumate's Falls the river drops approximately 6 feet in a horizontal distance of about 800 feet.

Q. Where is the principal channel?

A. The principal channel leads upstream through the center of the rapid first toward the left bank then turning toward the right bank passes into the upper pool.

Q. What is the width of the channel?

A. The channel at the lower end has a width of 28 feet and a minimum depth of 2.3 feet over the boulders, the depth increasing generally upstream to 3 and 4 feet.

Q. What is the minimum notch channel in the middle portion of the rapid?

A. This channel has a width of 16 feet with a depth of, a minimum depth of 2.1 feet over the boulders.

Q. What is the width of the channel?

A. 16 feet.

1146 Q. The width?

A. That is the minimum width.

Q. What is the width at the head of the rapids?

A. At the head of the rapids over 40 feet wide, and over 3 feet deep.

Q. Then what is the velocity?

A. The velocity at the head of the rapid is 2.3 miles per hour, and the minimum channel notch 1.9 increasing to 3.5 miles per hour at the foot of the rapid.

Q. What was the next shoal you visited?

A. East River Shoals.

Q. Where is that located?

A. At approximately mile 94.1, just below Glen Lyn.

Q. What is it known as?

A. This shoal was known as East River shoals and noted on my list as #5.

Q. What is the character of it?

A. These shoals form a gravel and boulder bar approximately 2,000 feet long.

Q. You mean by that up and downstream?

A. Yes, sir; soundings were made in the main channel, which runs approximately down the center of the stream.

Q. What is the width of the channel?

A. A clear channel over 30 feet wide was found, with a minimum depth near the head of 1.5 feet, increasing downstream to 3 feet at the foot of the shoals.

Q. What was the maximum velocity?

A. The maximum current velocity measured at the head of the shoals was found to be 2.5 miles per hour.

Q. What was the next shoal you visited?

A. Rich Creek Shoals, which I located opposite the mouth of Rich Creek, at mile 97.5, and noted as Shoal #6.

1147 Q. Describe it?

A. This shoal consists of several ledges at a point where the river channel is divided by islands. Where the river channel is divided by islands.

Q. Any gravel there?

A. Yes, sir; the river bottom at this point consists of gravel with some boulders and in most places a solid rock ledge foundation where the current is swift.

Q. Where is the channel located?

A. The principal channel is on the right-hand side there near the head of the upper island.

Q. What is its width?

A. This channel was found on the right-hand side of midstream, about 28 feet wide, or rather was measured 28 feet wide with a minimum depth of 2.2 feet.

Q. What was the velocity?

A. The current velocity through this notch was 2.4 miles per hour.

Q. Where was the next shoal?

A. Peter's Mountain Falls.

Q. Where is it located?

A. A rapid located at mile 100, 1 mile below the Narrows Highway bridge.

Q. Please describe the conditions you found in this Peter's Mountain Shoals?

A. At Peter's Mountain a series of rocky ledges extend across the river, causing a total drop of approximately 5 feet in 1,000 feet, the greater part of which occurs at the lower group of ledges.

Q. Where is the principal channel located?

1148 A. The principal channel occurs through a notch in the lower ledge, approximately in midstream, ascending toward the right bank and then upstream through a notch in the upper ledge, about 100 feet from the right bank.

Q. What is the depth, minimum depth you found there?

A. The minimum depth found was 2 feet in the lower notch with a minimum channel width of 15 feet.

Q. What was the velocity?

A. The current velocity measured in the lower notch 4 feet from the border was 2.9 miles per hour, from which the maximum notch velocity was estimated to be 4.3 miles per hour.

Q. What was the next shoal you visited?

A. An unnamed gravel bar 1½ miles above the Narrows Highway Bridge, at approximately mile 103.0 noted as Shoals #8.

Q. What was the character of the channel there?

A. Here a wide channel was found near midstream with a depth of 2.6 feet for a width over 40 feet.

Q. What was the velocity?

A. The current velocity was 3.2 miles per hour.

Q. Please state the next shoal you visited?

A. The next shoal upstream is an unnamed shoal near Pearisburg railway station, at approximately mile 104.3 noted as shoal #9.

Q. Are you correct on that 103.8, isn't that 104.3?

A. Yes; you are right; that is, I would like to pass that, I have the reference but it will take a little time to look it up. It is within ½ mile anyhow. [After looking at notes.] 104.3 is right.

Q. What is the character of the river bed at that point?

A. Here we found a ledge at the foot of an island, with a minimum channel depth of 2.6 feet, over a width of more than 30 feet.

Q. What was the maximum current velocity?

A. The maximum current velocity was measured and found to be 4.4 miles per hour.

1149 Q. Where was the channel located?

A. It laid near the left bank toward the foot of the island.

Q. Please state the next shoal you visited?

A. The next shoal is French's Mill shoal, at mile 106.2 noted as shoal #10, where there was found a ledge and gravel bar with a channel near the left bank 33 feet wide, having a minimum depth of 2.3 feet and the current velocity was 2.9 miles per hour.

Q. You stated that shoal was located at mile 106.0, isn't it 106.2?

A. That is correct. May I say that all of the mileages noted in this testimony are for the purpose of identification and are subject to slight approximation, they were taken from the best available maps, and various maps differ, but I believe they are sufficient for identification.

Q. What was your next shoal?

A. An unnamed shoal at mile 107 noted as shoal #11.

Q. What was the nature of the channel there?

A. Here there was found a ledge and boulder bar with a channel 18 feet wide, having a minimum depth of 2.6 feet near midstream.

Q. What was the current velocity?

A. The current velocity at a point 15 feet upstream from this notch was found to be 1.2 miles per hour from which the velocity in the notch was estimated at 2.3 miles per hour.

Q. Where was the next shoal?

A. Henley French shoal, mile 108.3, which was noted as shoal #12.

Q. What was the condition of the flow of the river at that point?

A. Here there was found a gravel boulder bar about 1,000 feet long, with a channel near the left bank.

Q. What was its width?

A. 18 feet.

Q. What was the depth?

A. Having a minimum depth of 2.2 feet.

1150 Q. What was the maximum channel current there?

A. The maximum channel current velocity was 3.4 miles per hour.

Q. Did the next shoal you visited have a name?

A. The next one is unnamed, at mile 109.3, noted as Shoal #13.

Q. What was the condition of the river bed at this point?

A. Here there was found a ledge across the river with a large notch at the right bank 28 feet wide, having a minimum depth of 4 feet.

Q. What was the current velocity?

A. The current velocity was measured 4 feet from one side of this notch at 2.3 miles per hour.

Q. What was the maximum current velocity?

A. The maximum current velocity was estimated at 3.0 miles per hour.

Q. Please state the next shoal you visited?

A. Another unnamed shoal at mile 110.0 noted as Shoal #14.

Q. What was the structure of the river bed at that point?

A. Here we found a rock ledge downstream from a boulder-strewn bar with a large notch at the left bank 30 feet wide and over 30 feet deep.

Q. Thirty feet deep?

A. Over three feet deep.

Q. What was the maximum current velocity at this point?

A. Maximum current velocity was found to be 3.3 miles per hour.

Q. What was the next shoal you visited?

A. Unnamed shoal at Mile 111 just above the Ripplemead highway bridge, noted as Shoal #15.

Q. What was the condition of the river bed at this point?

A. Here there was found a rock ledge across the river with a channel near the left bank 20 feet wide and having a minimum depth of 2 feet. The current velocity was found to be 2.6 miles per hour.

Q. What was your next shoal?

A. Snidow's Ferry shoal, at mile 112, noted as #16.

1151 Q. That is 111.8 is it not?

A. Yes, sir; which was found to consist of two ledges about 500 feet apart with openings near midstream.

Q. What was the minimum channel depth?

A. The minimum channel through this opening was found to be 2.6 feet deep.

Q. What was the width?

A. 40 feet.

Q. And the velocity?

A. The current velocity 1.1 miles per hour.

Q. Where did you next visit a shoal?

A. Walker's Creek Bar, at mile 113, noted as Shoal #17. Here there was found a gravel and ledge bar 2,400 feet long, with a broad channel between upper and lower islands.

Q. What was the minimum depth and width there?

A. Having 2.2 feet minimum depth and a minimum width of 23 feet.

By Mr. JACKSON:

Q. May I inquire for my information when you speak of gravel and ledge bar being 2,400 feet long, you mean measured up and down the river?

A. In the direction of stream flow.

By Mr. THOMPSON:

Q. What was the maximum velocity?

A. 3.1 miles per hour.

Q. Where was the next shoal?

A. Little Stony Creek bar, at mile 114.7, just below Pembroke highway bridge, noted as Shoal #18.

Q. What was the condition of the river bed there?

A. Here there was found a gravel bar 1,400 feet long, with a major channel south of an island, below the mouth of Little Stony Creek.

Q. Where was the channel located?

A. In midstream.

Q. What was its depth?

A. A minimum of 2.6 feet.

1152 Q. What was its width?

A. 35 feet.

Q. State the maximum current velocity?

A. 3.3 miles per hour.

Q. What was your next shoal?

A. Next shoal was Snidow's Falls, which is a minor rapid, located at mile 118 and noted as Shoal #19.

Q. What was the condition of the river bed you found there?

A. A boulder ledge and gravel bar about 2,000 feet long. With upper, middle and lower riffles.

Q. What was the channel width at this place?

A. Through the lower riffle a wide channel enters the midstream following up toward the left bank, with a width of over 30 feet, and a depth of 3 to 4 feet or more.

Q. Continue to describe that channel?

A. Through the middle riffle a channel extends in midstream over 30 feet wide, and more than 3 feet deep, following up near midstream through the upper riffle the depth decreases to a minimum of 2.3 feet, with a minimum width between boulders of 16 feet.

Q. What is the maximum current velocity at this point?

A. In the lower riffle 2.5 miles per hour and the middle riffle 3.2 miles per hour, and in the upper riffle 3.9 miles per hour.

Q. Where was the next shoal you visited?

A. Sinking Creek Bar, at mile 119.2.

Q. What was the condition of the river bed there?

A. There was a gravel and ledge bar about 1000 feet long with upper and lower riffles.

Q. What was the channel width at this point?

A. Over 30 feet.

Q. Where was it located?

1153 A. Near midstream.

Q. And what was its depth?

A. Over two feet.

Q. What was the maximum current velocity?

A. 2.1 miles per hour.

Q. Describe the next shoal?

A. This was Upper Sinking Creek shoal, at mile 119.7 noted as Shoal #21, which was found to be a ledge rock bar, with a channel 20 feet wide and more than 3 feet deep, near the center of the ledge.

Q. What was the current velocity?

A. The current velocity was measured 6 feet from the edge of the notch at 2.8 miles per hour.

Q. What was the maximum velocity?

A. The maximum velocity at the center was estimated at 3.4 miles per hour.

Q. What was your next shoals?

A. Eggleston Shoals, at mile 120.7, ½ mile above Eggleston, noted #23.

Q. What is the maximum current velocity?

A. This shoal was found to be a rock ledge and with an open channel in midstream 18 feet wide, having a minimum depth of 1.8 feet, maximum current velocity was 2.9 miles per hour.

Q. What was the next shoal?

A. An unnamed shoal at mile 121.5, noted as Shoal #23.

Q. What was the character of the stream bed there?

A. There was found to be a rock ledge projecting from the right bank with a channel opening 16 feet wide.

Q. What was the minimum depth?
A. 2.6 feet.
Q. Where was it located?
1154 A. Near midstream.
Q. What was the current velocity?
A. May I clarify, the channel opening was near midstream with a minimum depth of 2.6 feet. The maximum current velocity was 4.4 miles per hour.
Q. Please state the next shoal you visited?
A. An unnamed shoal near mile 123.1 noted as Shoal #24.
Q. What was the condition of the river bed at this point?
A. This was found to be a series of rock ledges extending diagonally across the river, with a minimum open channel through the lower ledge 40 feet wide, near the right bank.
Q. What was the minimum depth?
A. The minimum depth was 2.3 feet.
Q. And what was the current velocity at this notch?
A. 2.6 miles per hour.
Q. Do you care to describe the ledges any further?
A. Above this minimum section there are upper ledges grouped in the same shoal which are located about 1,000 feet upstream with an open channel through them.
Q. State the next?
A. An unnamed shoal at mile 123.3, where there were found four rock ledges extending across the river with a channel 30 feet wide, near the right bank over 3 feet deep.
Q. What was the current velocity at this point?
A. 1.8 miles per hour.
Q. Do you care to describe the river bed any further?
A. Approximately 1,000 feet upstream another series of four rock ledges, which were noted as shoal #26, extend across the river, with a channel between midstream and the right bank, having a minimum width of 16 feet, and a minimum depth of 2.1 feet. The current velocity being 2.0 miles per hour.
1155 Q. What was the minimum channel depth?
A. 2.1 feet.
Q. And what was the current velocity?
A. 2.0 miles per hour.
Q. State whether or not there were any riffles on the open channel?
A. 500 feet upstream four minor riffles with an open channel also are visible.

By Mr. JACKSON:

Q. The four minor riffles 500 feet upstream are at what shoals?
A. They form part of shoal #26.

By Mr. THOMPSON:

Q. Describe the Big Walker's Mountain shoals?

A. Big Walker's Mountain Falls constitute a rapid located at mile 124.6 noted as shoal #27, where two major and three minor rock ledges extend across the river causing a drop of approximately 5 feet in a 300-foot length.

Q. What is the width of the channel there?

A. Twenty to thirty feet.

Q. Describe the down-stream conditions of the river bed.

A. This channel with a depth not less than 3 feet extends through the two down stream major ledges, about 200 feet from the right bank, and then upstream toward shore, through a notch in the upper ledge 100 feet from the bank, thence straight upstream. At one point between the upper and lower ledges a rock projection constricts this channel to a width of 16 feet with a depth over 4 feet.

Q. What is the current velocity?

A. 4.2 miles per hour.

Q. Please describe the next shoal?

A. Sifford's Falls, a shoal noted as #28 consists of a series of ledges, extending across the river over a length of about 2 miles.

By Mr. JACKSON:

Q. Did you give the mileage?

A. I will if you wish it, approximately from mile 125 to mile 127.

Q. Three miles long?

A. That is right.

By Mr. THOMPSON:

1156 Q. What is the total fall?

A. The total fall is approximately 30 feet, which is divided between the large number of rocky ledges, the fall across each one amounting usually to only a few inches. The current velocity is moderate, ranging from 1 to 2 miles per hour.

Q. Did you locate a channel there?

A. Yes, sir.

Q. Where was it?

A. There was a channel having a minimum clearance through the smallest openings which occurred through the middle portions more than 1 foot depth over an 8 foot minimum width.

Q. What was its depth?

A. Over a width of 8 feet, a minimum of 1 foot, a depth of 2 feet or more could probably be maintained near the middle of these openings.

Q. What was the condition upstream?

A. This channel follows close the right bank about 1¼ miles above Walker's Mountain and then persists about middle of the

river upstream, the depth of water in the many pools separating those rock ledges ranges from 3 to 5 feet.

Q. What was your next shoal?

A. Upper Sifford's Shoals, approximately ½ mile above McCoy's Ferry, noted as Shoal #29, but forming a part of what may be considered Sifford's Shoals, mile 127.2.

Q. Describe the stream bed at this point?

A. This shoal was found to consist of two rock ledges with a minimum channel opening through the lower ledge near midstream; having a width of 10 feet, with a minimum depth of 1 foot, and a current velocity of 1.4 miles per hour. A depth of 2 feet or more would probably be maintained in a narrower opening.

By Mr. JACKSON:

1157 Q. What do you mean when you say that?

A. This clear channel may be described as a rectangle of the dimensions I have given, inserted in the clear opening of the natural channel, which is, of course, regular, so that a channel may be for instance 2½ feet deep and 25 feet wide, and at the same time have a center depth of 5 or 10 feet.

Q. You have testified there was a minimum depth here of 1 foot?

A. Yes, sir.

Q. Did you find any other place in this entire stretch that was as shallow depth as that?

A. I did not.

By Mr. THOMPSON:

Q. What is the next shoal you visited?

Q. Whitethorne Ferry Shoal, near Mile 130.3, noted as Shoal No. 30, which was found to consist of four rock ledges extending across the river, with a minimum channel of 20 feet wide and 1.5 feet deep, passing through openings in the ledges near midstream. The current velocity was 2.4 miles per hour.

Q. The Whitethorne Shoal was Mile 130.5?

A. Yes.

Q. Should it not be 130.3?

A. Yes, sir.

Q. What is the next Shoal?

A. An unnamed Shoal, near Mile 134 in the so-called Horse Shoe Bend, noted as Shoal 31, which was found to be a gravel bar and ledge with a channel in midstream 20 feet wide, having a minimum depth of 2.3 feet, and a current velocity of 3.2 miles per hour.

Q. What was the next shoal you visited?

A. An unnamed shoal near Mile 136.6, noted as Shoal 32.

Q. 136.6, isn't it?
A. That is right.
Q. What was the condition of the river at this point?
1158 A. This was found to be a gravel bar 600 feet long, with a broad, shallow channel near midstream.
Q. What was the minimum depth?
A. The minimum depth was found to be 2.2 feet.
Q. What was the minimum width?
A. The minimum width was 28 feet.
Q. What was the current velocity?
A. The current velocity was 1.4 miles per hour.
Q. Did you next visit Barnette's Falls?
A. Yes, sir.
Q. That is spelled "Barn-e-t-t-e"?
A. Yes, sir.
Q. Where was it located?
A. This was a minor rapid located at Mile 138.0 and noted as Shoal No. 33.
Q. What was the condition of the river bed?
A. Here there were found five rock ledges extending across the river with a gravel bar at the right bank. A channel with a minimum width of 15 feet and a minimum depth of 2 feet extending up through the lower rapid on right side of channel not far from midstream passing by upper ledges near the right bank.
Q. What was the current velocity?
A. 2.7 miles per hour.
Q. Check on that, please. Is it not 2.8?
A. Yes, sir; you are right.
Q. State the next shoal you visited?
A. Lower Pepper Falls, a shoal noted as No. 34, 0.3 of a mile below Pepper's Ferry.
Q. Where was it located as to mileage?
A. This lower Pepper's Falls is at Mile 139.7 on the river.
Q. What is the condition of the river bed?
A. This was found to consist of two rock ledges about 400 feet apart extending across the river with boulder patches be-
1159 tween them. These ledges are submerged and a channel with a minimum width of 13 feet, minimum depth of 2.4 feet passes across them, and between the boulder patches somewhat to left of midstream. The maximum current velocity here was 3.7 miles per hour.
Q. Did you keep any record of the width of the river when you were making these measurements?
A. No, sir.
Q. Now what was the next shoal you visited?

A. Upper Pepper Falls, a minor rapid located 0.2 miles above Pepper's Ferry, at Mile 140.3, noted as Shoal 35.

Q. What did it consist of?

A. This shoal was found to consist of a number of irregular rock ledges extending across the river, with a channel 30 feet wide and more than 2 feet deep, passing through openings approximately 100 feet from the right bank.

Q. What was the current velocity?

A. 2.3 miles per hour.

Q. Where was your next shoal?

A. At the mouth of Crab Creek, Mile 142.1, noted as Shoal 36.

Q. Just check back on that, it that 142.1 or 141.8?

A. Make that 141.8.

Q. What is the river bed there, what does it consist of?

A. Here there was found a ledge extending from the left bank with an opening at the right bank over 60 feet wide by 3 feet deep. The current velocity was found to be 3.9 miles per hour.

Q. What was the next shoal you visited?

A. An unnamed shoal; near Mile 142.8 and noted as Shoal 37.

Q. Please look at your figures again and see if you stated that correctly about the mile?

1160 A. Make that Mile 142.8.

Q. What was the condition of the river bed there?

A. This was found to consist of three submerged ledges with channel openings near midstream. The minimum clear opening through middle ledge was found to be 2.1 feet deep by 40 feet wide. The current velocity was 2.3 miles per hour.

Q. On coming to these shoals which you have been describing and the channels, did you notice whether there had been any work done there? Was there any artificial construction of channel or was this all natural channel that you have been describing. Were there any indications of such?

A. Without exception, I believe these were natural channels. At one or two points there have been improvements in the nature of mills, notably at French's Mills, Shoal 10, and Pepper's Mountain, Shoal 7, but so far as it was observable, nothing has ever been done to the channel.

Q. There were no remains of wing dams or anything of that kind?

A. No, sir.

Q. What was the next shoal you visited?

A. An unnamed shoal at Mile 143.9, which was noted as Shoal 38.

Q. Now describe the river there?

A. This shoal was found at a small island near the center of the river, with a rock ledge projecting into the channel, which

was to the left of the island, with a clear width of 35 feet in midstream and a minimum depth of 2½ feet.

Q. What was the velocity?

A. The current velocity was 3.0 miles per hour.

Q. What was your next shoal?

A. An unnamed shoal near Mile 143.4, noted as Shoal No. 39, where a rock ledge was found extending across the river, with a channel 25 feet wide near the left bank.

1161 Q. What was the minimum depth?

A. The minimum depth was 2.5 feet.

Q. What was the current velocity?

A. 2.8 miles per hour.

Q. Now please read the next shoal that you visited?

A. An unnamed shoal near Mile 143.9.

Q. Should not that be 144.2?

A. May I have the last question read?

(Question read.)

A. That should be Mile 144.2, noted as Shoal No. 40.

Q. Now this is the last one you are describing.

A Yes, sir.

Q. Go ahead and describe the conditions there?

A. Here there was found a submerged ledge extending across the river, with a 30 foot clear channel near midstream, having a minimum depth of 2 feet and a current velocity of 2.3 miles per hour.

Q. Now state the next shoal you visited?

A. An unnamed shoal, near Mile 145.0, noted as Shoal No. 41, where there were found three rock ledges extending across the river, with a channel between midstream and the right bank over 20 feet wide, and with a minimum depth of over two feet, and a current velocity of 2.5 miles per hour.

Q. Does that conclude all of the shoals or rapids that you visited at the time you have named and described between Wiley's Shoals and Radford?

A. It does.

Q. Were you able to form any general conclusions as to the nature of this section of the river?

A. Yes, sir.

Q. What was it?

By Mr. JACKSON. We object to "general conclusions," unless counsel clear it up. General conclusions in what respect?

By Mr. THOMPSON. As to rapids, shoals, bars, and channel depths.

By the COURT. Go ahead.

A. During the survey which has been described, the
1162 entire stretch of New River between Wylie Falls and New River was examined, and all shoals, bars, and rapids were

visited and surveyed as just described. A channel depth of from 3 to 6 feet prevails generally, with a limiting depth at shoals of 2 feet or more, with the five exceptions noted.

Q. Five exceptions?

A. Yes; the current velocities encountered in this section are to be considered quite moderate, inasmuch as the maximum found was 4.4 miles per hour, and velocities of 5 to 6 miles per hour are easily negotiated by launches and other river craft——

By Mr. JACKSON. I move to strike out the last sentence, because that must be nothing but an opinion of the witness.

By the COURT. I will let it stay in for the present.

By Mr. JACKSON. We desire to take an exception.

A. (Continuing.) May I add that my work with the United States Engineering Department has included extensive operations and direction of launches and river boats.

By Mr. THOMPSON:

Q. Did you observe any navigation on the river, or that part of the river which you have been describing?

A. Yes, sir.

Q. What was the nature of it?

A. There were many small boats observable along the river, several equipped with motors and ferries are being operated at numerous points on the river.

Cross-examination by Mr. JACKSON:

Q. When did you graduate from the University of California?

A. In May 1922.

1163 Q. On your direct examination you told us about what you described as a survey made from Wiley Falls to Radford Bridge. Is that right?

A. That was right.

Q. What date was that?

A. From June 22, to 29th, and July 13th to 15th, all dates inclusive.

Q. How far did you go from June 22nd to June 29th?

A. I covered the entire stretch of river described.

Q. Then you were back again on July 13th?

A. Yes, sir, that is correct, the 13th to the 15th.

Q. Did you make a survey when you were there July 13th to July 15th?

A. I revisited the same points.

Q. When you say you covered the whole stretch from Wiley Falls to Radford Bridge on your trip, June 22nd to June 29th—is that correct?

A. Yes, sir.

Q. Did you complete the survey during that period?
A. No.
Q. How far did you complete the survey during that period?
A. I visited a number of shoals, well, I visited all of them, and measured the greatest number, and then on my revisit of
1164 July 13th to 15th, I went back and remeasured some of those I had been over previously, and measured a number of others in addition. In other words, on my first trip I made measurements at the principal shoals. On my revisit I went back and measured all that were thought to be of any significance.
Q. Tell me what shoals you measured on your first trip, just name them?
A. I will have to dig back in my note book. I measured some of them once, and some twice. I have all inclusive dates here and exclusive ones I will have to refer to my original notes for.
Q. When did you actually start making these so-called surveys?
A. June 22nd.
Q. From where?
A. At Wiley's Shoal.
Q. Did you continue on that survey without any interruption?
A. Yes, until the end of that week, June 26th, and then I went back the following Monday and Tuesday, June 28th and 29th.
Q. Then you spent seven days on the work at that time?
A. Eight days, is it not, Monday to Saturday, inclusive, and Monday and Tuesday?
Q. How many people were with you on that first occasion?
A. There were four with me.
Q. Who were they?
A. The surveyor.
Q. His name——
A. Johnson.
Q. Of the Commission?
A. United States Engineering Department—two rodmen and a chauffeur. Part of the time I had five men and the rest of the time I had four.
Q. What was the work of the fifth man?
A. He was a rodman.
1165 Q. Would you survey along the bank of the river?
A. No; we went along the river and I inspected the entire river.
Q. Did you walk?
A. We walked and rode in an automobile.
Q. Was there a highway along the river much of the way?
A. A good part of it, and wherever we could see the river from the road, we rode, and where we could not see the river from the road, we walked. As you know, the Norfolk & Western and

Virginian traverse most of the stretch and we used the railroad grade a great deal.

Q. And you and your party were working all of that time, walking sometimes and riding sometimes?

A. Yes, sir.

Q. And you and your party covered this distance from Wiley Falls to Radford Bridge, either on foot or along the highway, where that was close enough to see the river?

A. That is right.

Q. How did you determine when you would go down to the river and examine the bed?

A. As we went along, I watched the river and stopped and examined any point where the current showed any signs of interruption, and at those points where the depth was less than three feet, we went down into the river, waded out and measured it.

Q. What criteria did you apply in forming your opinion as to whether the depth was probably less than three feet or not?

A. The appearance of the water.

Q. You did not follow the bed of the stream then continuously?

A. I did not.

Q. You did not wade the stream?

A. Continuously, no.

Q. You did not attempt to boat up the stream?

A. Only at two points.

Q. Your trip was made, as I understand it, during this week, either on foot or by automobile?

1166 A. Yes, sir; that is correct.

Q. Now, when you came to a point where you decided to examine the bed of the stream, how did you make the examination?

A. We went down to the river first and looked at the shoal, walked up and down, examined the length of the shoal, picked out the points where the depth or width or current velocity appeared to be critical, that is, where the depth was least, where the width was least or the current velocity was fastest, and by an examination it was possible to make a fairly satisfactory selection of the one, two, or three critical points. Then these were visited, that is, we waded right out in the river, as shown by those photographs and measured the depth and width of the river at those points, and current velocity. The ones I have given you are ones of minimum depth and width and maximum velocity.

Q. Didn't you tell counsel on your direct examination that you did not measure the width of the river?

A. The width of the clear opening of the channel. I was interested in finding a clear opening as wide as 30 feet or wider. If it was wider than that, I did not bother much about the excess width.

Q. Do you mean that you attempted to measure the width of the channel?

A. That is correct.

Q. How many miles did you cover on this occasion?

A. From Mile 88.6 to Mile 146.1 or approximately 57 miles.

Q. Did you walk the substantial part of it?

A. A pretty substantial part.

Q. How rapidly did you walk?

A. I expect about three to four miles an hour when we were walking.

Q. Did you have any equipment to carry?

A. Yes, sir.

Q. Much?

A. Rods, current meter, notebooks and maps.

1167 Q. Was the current meter pretty heavy?

A. No; it weighed about 5 pounds. These were what is known as wading measurements, and a man held the meter in his hand and we omitted the customary weight, which is ordinarily 25 pounds.

Q. When you reached one of these falls, or shoals as you call them, which was 2,000 or 2,400 feet up and down the river, how did you find out what was the shallowest point on that shoal?

A. By looking at it.

Q. You did not attempt to pick out the channel and walk up and down the channel for the full length of that shoal to determine where the shallowest place would be?

A. I did for all portions of the shoal that appeared to be the shallowest. Now when I started in I spent quite a bit of time on Wiley's Shoal and at Shumate's Fall, I spent some time fooling around there and sharpening up my judgment as to the depth of the water from its appearance, and that is a specialized kind of judgment that can be acquired in a couple of days, and lost just as quickly, but I did that. As I went along I used that knowledge as to each shoal, one, two, three, and when conditions were the most important, then I would go out to these one, two, three, or four places and make actual measurements.

Q. So that if, however, your sharpened judgment was not adequate to pick out from an inspection on the bank either the shallowest or swiftest part of the channel, there would be no examination made by you or your party, which would check and reveal that error, would there?

A. That is correct. I purposely stated in my direct examination that this survey was an examination and survey. That is, a descriptive title used by the United States Engineers to describe the kind of survey which I made. It is intended to be practical

and adequate to cover the purposes for which it was intended and not to go into unnecessary refinement.

1168 Q. It is a sort of spot check survey, isn't it?

A. It would be a spot check if it were blindly placed. The words "spot check" are used in accounting by accountants, and he, when he is making an examination, knows nothing at all about the background of those figures. I had to look at the whole river, which is a continuous check and then I chose to investigate more intensively those parts that looked suspicious which, in my judgment, is adequate for the purpose which it was intended, which is to develop an open channel sufficient to pass boats.

Q. It is not what you would regard as an engineering survey of the stream?

A. It is not a complete instrument survey, which I gather is what you are driving at.

Q. It is not the kind of survey that was made by Mr. Hutton in 1872, is it?

A. Yes, sir; it is.

Q. Do you think it is?

A. Wait a minute.

Q. Do you know how many months he spent on that?

A. Mr. Hutton covered a lot more of the river than I did, too. It partakes of the nature of the survey made by Mr. Hutton in that he sounded the river at critical points, just as I did. The work he did in addition to what I did, was to carry along over a part of his survey, the compass line or traverse line and also to sketch in the mountains and hillsides as he went along.

Q. What time did you start to work in the morning?

A. Usually seven o'clock, sometimes a little earlier.

Q. Where did you stop?

A. Anywhere from six to seven in the evenings, sometimes a little later.

Q. I meant at what place did you stop?

A. I beg your pardon.

1169 Q. Will you give me the name of some of the places you stopped in June, while you were making this survey?

A. Most of the time I stopped at Narrows.

Q. At the Hotel there?

A. At a boarding house, a surveyor's Boarding House, used by the United States Engineers, and one night at Blacksburg. May I add, Mr. Jackson, in addition to the two periods I spent on the river, I spent additional time on the river inspecting, looking and forming my judgment.

Q. Just a moment, what kind of a survey did you call it?

A. Inspection and survey.

Q. This is an inspection and survey?
A. I beg your pardon—examination and survey.
Q. You covered 57 miles of the river in eight days the first time?
A. That is right, eight days plus three days.
Q. Later on you went back and made a recheck?
A. That is right.
Q. But your initial examination took eight days?
A. The recheck included measurements at points which I had not measured the first time, so that you might say the survey covered a period of eleven days.
Q. Was the reason for your survey that the sharpening of your judgment at Wyley's Falls the first time had not been sufficient to detect all the shallow places in the river going upstream?
A. No the reason was the first time I had general instructions to examine the river, and I did so, according to my best judgment, and looked at and located and measured the principal—what I thought were the principal shoals—and when I came back, I checked more carefully those I had passed by lightly, the second time.
Q. Do you remember those that you passed by lightly the first time?
A. Yes, sir; Rich Creek Shoals for one, I think.
Q. And what led you to think that you had better examine it again?
1170 A. Orders from Mr. McWhorter to omit no shoals.
Q. Did you have a copy of the Hutton Survey with you, Mr. Gerdes?
A. Yes, sir.
Q. In making this inspection?
A. Yes, sir.
Q. Did you rely on that for the location of the shoals?
A. I did not.
Q. Did you check with it at all going along?
A. I checked with it and found it was quite accurate and at the end of the survey, I found—by the end of the survey, I would say I found it quite accurate.

By Mr. THOMPSON:

Q. You say you found it quite accurate?
A. I found it quite accurate; yes, sir.

By Mr. JACKSON:

Q. In one particular instance, you were asked for the maximum velocity at these channels, as you describe, and shoals, and you said the apparent velocity was some figure. What did you say about apparent velocity?

A. What I said was velocity was measured at some points not in the center of the channel, where the maximum center velocity was measured by comparison. That is a simple process known and practiced by hydro electric engineers. You measure some places by comparison, and I measured the velocity near the side and then tossed chips into the stream where the maximum thread was and observed the ratio of flow, as to whether it was 120, 130 or 150% in comparison.

Q. That requires pretty well educated judgment, too, does it?

A. To a hydraulic engineer, not unusually so.

Q. You have to keep that sharpened up to use it, do you?

A. I say it will have to be kept sharpened.

Q. Had you done much of that before you made this survey from Wyley's shoals?

A. Not for the past year. Previous to that time, I had spent considerable years doing that.

Q. Yes. But you don't call a year a short time in that 1171 connection, do you?

A. It is like swimming—once learned, it is not easily forgotten.

Q. I want to call your attention especially to your shoal 13?

A. Yes.

Q. Do you have that. I understood you to say that that had a channel 28 by 4 feet?

A. That is right.

Q. And that you measured the current velocity?

A. Yes, sir.

Q. Four feet from the edge of the notch, as being 2.3 miles per hour?

A. Shoal 13—may I check the statistics here? [Witness refers to papers.]

Q. All right.

A. [Witness examines papers.] That is right.

Q. And then you say you estimated the velocity in the middle of the channel at some figure?

A. Three miles an hour.

Q. Why didn't you measure the velocity of the middle of that channel?

A. May I have the maps, please. [Papers are handed witness by Government counsel.]

Q. Was it too dangerous to get in the middle of the channel?

A. I will tell you in a moment. [Refers to papers.]

Q. You cannot now recall as to whether or not it was too dangerous?

A. If you will permit me to glance at the shoal. [Examining papers.] I want to be sure which shoal I am thinking of and I

will answer you. It is easier to recall them by location and description than it is by number.

Q. I thought you remembered if it was too dangerous to get out in the middle?

A. Number 13 [indicating with papers]—that would be
1172 French. May I have the photograph album? [Book is handed to witness by Government counsel.]

Q. Your notes do not enable you to say if it was too dangerous?

A. Yes; my notes do. Do you mind if I consult my record? [Examines book and papers.] This is part of my notes [indicating photograph album].

Q. The photographs are part of your notes.

A. That was 13. The combination of depth and velocity was—of the water—was more than it appeared a man could stand up in while holding a current meter. I do not say it was too dangerous, but we were trying to get along and get it finished.

Q. Isn't it a fact that in all of these cases, on this examination-survey, where you have testified that the current velocity at a certain point on the side of the channel was so much, and that you estimated it to be so much greater in the center of the channel, that you regarded it as being unsafe to go into the center of the channel and make the current meter measurements?

A. I don't know that I would use the word "unsafe." I regarded it to be most practical to measure where I did.

Q. You regarded it as unwise to go into the center of the channel, did you?

A. Unwise in that I had a survey party under my direction and it cost a number of dollars a day in expense to do the work, and there was no use wasting time around there.

Q. Some places you went into the middle of the channel, did you?

A. Yes, sir.

Q. And it did not take you much longer to walk out in the middle or 28 feet—in the middle of a 28-foot channel, than to walk four feet from the side, did it?

A. If a man had to try it three times and swim down stream with a current meter and we had to hitch a rope around him, it would take several hours.

1173 Q. If a man was in the middle of the channel and was washed downstream with a current meter, that would take time and be hazardous, wouldn't it?

A. No, sir.

Q. Did you go in the middle of the channel and make those yourself?

A. Yes, sir.

Q. I suppose, being in charge of this party, you felt some responsibility for the safety of the men, did you not?

A. Yes, sir.

Q. Under you?

A. Yes, sir; that is right.

Q. And you would not have felt justified in exposing them to undue hazards in going into the channels to make measurements?

A. Since you stress hazards so, I will say I did not think it hazardous, because these places were usually restricted openings in an otherwise wider channel and immediately below, and using ordinary prudence——

Q. And shallower? Is that right?

A. Well, no, sir; it gets shallower in the larger sections——

Q. But it is not prudent?

A. We are getting paradox on paradox. A channel opening may become broader and at the same time it causes the water to slow up and the volume of water requires more space; the velocity slows up and a man can walk easier in it.

Q. The reason you do not think it is hazardous, is because you think, downstream, there will be a place where the current will have slowed down enough so that a man would be able, if carried away, to rescue himself?

A. Yes, sir.

1174 Q. But, of course, at all places, where you regarded it was practically safe or feasible, you did take the current measurements in the middle of the channel?

A. Yes, sir.

Q. When you have given the width of one of these channels as so many feet, and the minimum depth as so many feet, did you make any determination over how wide a portion of the bottom of the channel the minimum depth obtained?

A. Yes, sir; I did.

Q. You testified that the minimum depth stated by you prevailed over part of the width of the channel, you stated?

A. Yes, sir.

Q. There was no case where the channel was deeper in the middle than on the side, was there?

A. There is, but I said the minimum depth prevailed over the width. The use of the word minimum means it was the least depth over that width. The depth may be often and usually was, much greater over a part of that.

Q. You did not, in any of these shoals or rapids, undertake to try to find the minimum depth by riding a boat down through the shoals and rapids from one end to the other, did you?

A. I did.

Q. Where?

A. At East River Falls and at Wyley's shoals.

Q. Any other place?

A. No, sir.

Q. Why did you abandon that practice?

A. I did that at those two places because there were survey boats available at those two points, and at other points, I did not think it necessary to bring a boat for that purpose.

Q. At these two points, you said there are notches cut by the Government—Wyley's Falls?

1175 A. I did not. I mentioned Wyley's shoals.

Q. How far downstream are Wyley's Falls from Wyley's shoals?

A. It is a half mile above Wyley's Falls.

Q. There is no notch at Wyley's shoals?

A. No, sir; there is not notch there. The notch is at Wyley's Falls.

Q. You have changed all the historic terminology of Falls and Shoals on this river?

A. I used the word "Falls" where they were known as Falls. If you hear me say "Wyley's shoals," rapids you may know what I mean.

Q. Yes, sir. When you examined what you describe as the channels of these shoals and falls, did you find any of them crooked?

A. Yes, sir; occasionally, quite so.

Q. Will you describe what kind of channel you found at Peters' Mountain Falls?

A. (Witness examines papers.)

Q. And can you say if this is the same Falls at The Narrows?

A. Peters Mountain is the rapid just below Narrows highway bridge, one mile below it.

Q. And sometimes called the Falls of the Narrows?

A. I never heard it as that name. Yes, sir, it is shown as "Narrows" on the Hutton survey.

Q. Is there the remnant of a power station there?

A. According to the foundation on the left bank, which I understand belonged to a mill—which I was told belonged to a mill that had been erected there.

Q. Go ahead and describe the channel you found through Peters' Mountain Falls?

A. At Peters' Mountain Falls, the principal channel crosses through a notch in the lower ledge, approximately at mid-stream then towards the right bank and upstream through an opening in an upper ledge 100 feet from the right bank.

(Exhibit 515 marked for identification.)

1176. Q. I show you this photograph, marked defendant's Exhibit for identification No. 515, and ask if you can identify the view that appears thereon as that of the Peters' Mountain Falls?

A. (Examining photograph.) That appears to be the rapids at Peters Mountain Falls; yes, sir.

Q. There are how many ledges there?

A. There are visible in this photograph, I would say, three or four—one, two, three, and one that you might call this—submerged—the 4th is in there.

Q. Do you remember coming upstream where the so-called channel is, which side of the stream that is on this photograph?

A. Yes, sir.

Q. Which side?

A. The main channel enters approximately in the middle of the stream.

Q. Doesn't it enter on the right hand bank—on the opposite bank?

A. It does not.

Q. Where does it go from where you say it enters?

A. It enters at approximately mid-stream and goes up-stream towards the right bank, which is to the left in the photograph.

Q. Don't you travel back to the right bank a notch?

A. No. sir.

Q. Are you sure of that?

A. That is the way I see it.

Q. Isn't it a fact that when you examined that fully, you found that you had to travel along across that notch between the ledges and cross the other ledge at the other end [indicating]?

A. I don't quite follow you.

Q. When you entered from—this is going upstream [indicating], is it?

A. Yes, sir.

1177 Q. Looking at the photograph. When you entered here [indicating], you turned to the left and cut across the middle here [indicating] and isn't it a fact that the channel turns to the right and you have to go to the right bank to get across the upper ledge?

A. When I examined the stream, in my judgment, the best channel was when entering midstream then traveling up towards the right bank and going upstream there between the ledges near the right bank.

Q. Did you actually follow the main channel through the ledge?

A. I did not.

Q. You cannot say, can you, that the main channel does not turn back between the middle and upper ledges and then cross the upper ledge to go into the pond above?

A. If I may define the main channel, as that carrying the principal flow of water, the best channel is as I have described it.

Q. Was the water high when you got there?

A. No, sir; it was fairly low.

Q. Was it higher than appears from Exhibit 515, offered for identification by the defendant [indicating to witness].

A. Well——

Q. Was the water higher when you got there than it was as shown in Exhibit 515 [indicating]?

A. It is quite difficult to say. I don't think I could judge.

Q. Does that fall within the field of educated observation, from seeing the pictor'al reproduction of it, which you state you had developed when you went on this examination survey?

A. Did I say that?

Q. I thought you said you had sharpened your ability to do that?

A. I don't recall that I said anything about being able to judge the depth of water from photographs.

Q. Does it extend to that?

A. It is considerably more difficult when looking at a photograph, not accompanied by the real thing.

1178 Q. You said that you saw ferry boats on the river when you made this trip?

A. Yes, sir.

Q. And you saw some canoes?

A. Well, those were boats constructed of boards. I don't know that you would call them canoes.

Q. They were a sort of little flat bottomed sort of skiff; is that right?

A. Right—rowboats.

Q. And you saw a few that had outboard motors attached?

A. Yes, sir.

Q. When did you see these?

A. At various places along the river.

Q. Just name some of them?

A. East River Shoals; Wyley's shoals; one tied up at Wyley's Falls.

Q. Is that all?

A. Rich Creek, and a number of points along the river—mostly tied up at landings on the river bank.

Q. Were they pretty thick?

A. It looked like every farmer along the river had a boat.

Q. A motorboat?

A. Some of them.

Q. Mr. Gerdes, you said that you examined the Hutton survey and you found his records agreed in general with your observations?

A. Yes, sir.

Q. Now, when you examined that, did you notice in the reports of the Chief of Engineers for 1881, this statement made in Government's Exhibit 37, on page 906 of the Chief's report—the report of the District Engineer in 1881, and repeated by the Chief on page 144, as follows, without referring to the stretch of New River from the mouth of Wilson in Grayson County, Virginia, to the mouth of the Greenbrier in West Virginia—did you
1179 notice on both the district and chief engineer's reports, the summarized conditions, as follows:

"Throughout this distance, the navigable channel originally consisted naturally of chutes through the ledges and shoals of varying width, rarely over one foot in depth in some places, and so tortuous as to render navigation extremely difficult and dangerous." Did you observe that?

A. No, sir; if so, I do not recall it at this time. I must have read it, because I read those reports.

Q. Do you recall that the same statement or description was repeated by the district and chief engineers in subsequent reports for 1887, 1888, 1889, 1890, and 1899, and perhaps others?

A. I do not so recall at the present moment.

Q. There are a good many more but you, I take it, can't recall any of them now?

A. Possibly those gentlemen visited the river at a different stage.

Q. You think they might have visited the river at a low water stage?

A. They might have done it at extreme low water; I can't say, and, of course, if it is repeated from one report to the other, you understand, one observation may be reported in a number of reports.

Q. But they all relate to the original natural condition as found by the early Army Engineers. You understand that?

A. Do I understand your remarks or your quotation to refer particularly to the stretch of the river which I observed or to refer more specifically to the upper stretch of the river below Wilson Creek?

Q. It refers to the whole stretch from the mouth of Wilson in Grayson County, Virginia, down to the Greenbrier and down to the landing at Hinton.

A. Well, I would say then that there is a marked difference between the upper and lower portions of this reach described by your quotation and that my observation applied to the lower portion of that reach.

1180 Would it appear, according to this statement, that in the natural condition the shoots were rarely over a foot in depth that either the early engineers had been successful in finding the limiting depths or more successful than you or that there had been a great change since the early days?

A. I would say that that was a general statement and I expect considered the limitations of that entire stretch of river, which limitations would naturally be more severe in the upper section than in the lower which I examined.

Q. Do you understand, Mr. Gerdes, that this isn't limited to the upper section, that it extends to the Greenbrier which is below?

A. I did not so say. I said that is a general statement and naturally the limiting depths which it speaks of would be more apt to occur in the upper section than in the lower section where the stream flow is greater which you must admit.

Q. When I read the quotation you didn't overlook the significance of the opening words "throughout this distance," did you?

A. No, sir; I did not.

Q. I thought from your answer that you had. Will you refer to your Shoal No. 29. You found there, I believe, a channel ten feet wide and one foot deep?

A. Those are the limiting dimensions.

Q. And I understand you to tell counsel on your direct examination that you found no other depths so shallow on your examination and survey?

A. That is correct, no other depths shallower.

Q. Did you find other depths just as shallow?

A. Yes; at Shoal 8 immediately below.

Q. These are going upstream?

A. Yes.

Q. I take it from what you have said that you did familiarize yourself before making this examination and survey with the official reports of the Chief of Engineers dealing with the stream; is that right?

1181 A. I read over them.

Q. And did you observe repeated from time to time the statement that New River was a typical mountain stream, consisting of a series of pools interrupted by shallows, shoals and rapids?

A. I do not recall that statement.

Q. Well, whether you recall it or not, would you not say that that is an accurate description of the characteristics of New River in that regard?

A. Will you repeat that statement?

Q. (The question was read.)

A. That description is very broad. It might apply with equal propriety to a navigable river, and to a mountain torrent. I think New River would be covered by it.

Q. You told us about two trips that you made to New River, one from June 22nd to 29th, 1936, and the other one from July 13th to 15th of this year?

A. Yes.

Q. And I thought you said that you had made some other inspection of the New River; is that right?

A. That is right.

Q. Tell me what that inspection was and the date when it was made?

A. I had reference there particularly to the previous week.

Q. Previous to what?

A. Previous to July 13th–15th. I haven't the dates in mind at the moment, but I think that is July 6th to 8th, inclusive.

Q. July 6th to 8th?

A. Yes.

Q. And, generally, what sort of a trip was that?

A. That was an automobile and foot inspection of the river covering the same ground, reviewing and thinking over the work of the previous week.

Q. That is the river from down at Wylies Shoals up to Radford bridge?

A. That is right.

1182 Q. And any other occasion when you were at New River?

A. Yes; I have been on New River on other occasions.

Q. Recently?

A. Yes.

Q. When was the last time?

A. July 19th–20th and July 22nd.

Q. Who was the party with you then?

A. Each time there were a number of surveyors and rodmen of the United States Engineer Department. Do you want me to name them?

Q. Yes, please.

A. Johnson was in the party on the 19th and 20th. No; Johnson wasn't along that time. Pursinger July 6th to 8th, Gragnon July 19th to 20th and at the same time there were Gill and a couple of others whose names I don't place at the moment.

Q. Local people?

A. These were all local people over there.

Q. Were they employed by the United States Engineer Office?

A. The United States Engineer Department.

Q. All of them?
A. Yes.
Q. You were there the 19th?
A. Yes.
Q. Were you in a boat that day?
A. Yes.
Q. Did you get hung up on the falls?
A. Yes.
Q. Did you leave the boat at the falls?
Q. Did you get hung up at any falls on July 19th?
A. No.
Q. Were you at Bull Falls that day?
A. Yes, I believe I was.
1183 Q. Did you get out and pull the boat over Bull Falls on the 19th?
A. We got out and pulled the boat up through the old boat chute or navigation channel at Bull Falls.
Q. Why did you get out?
A. Because that was the easiest way of going up the channel.
Q. Easier to go on foot than in a boat, wasn't it?
A. Well, the boat we had was an Engineer Department boat with a small outboard motor on it. The motor didn't, we thought, have power enough to buck the current so we pulled the boat up.
Q. I suppose they didn't want their boat smashed up either, did they?
A. I don't think that entered into it.
Q. And did you get over Harvey's Ledge that day?
A. Yes.
Q. Did you get out and walk again?
A. That is right.
Q. You pulled the boat along?
A. That is right.
Q. Did you get up to Wylies Falls that day?
A. That is right.
Q. Did you get out and walk up there?
A. Not that day.
Q. You walked another day at Wylies Falls?
A. We pulled the boat up through the chute at Wylies Falls on another day.
Q. Did you get to Peters Mountain Falls?
A. That is right.
Q. Did you walk again there?
A. We pulled the boat up there.
Q. Did you get to Shumate's Falls that day?
A. That is right.

1184 Q. And was it hard to pull through there? Did you get out and walk through there too?

A. That is right.

Q. You did almost as much walking as riding?

A. I would say we pulled the boat up through those rapids in the same fashion that the boys used to do when they ran bateaux on the river.

Q. You think anybody that ever did get through there got out and walked?

A. I believe you have records in this case that it has been done before.

Q. There are some very unusual records. That is what made Ripley rich. Now, Mr. Gerdes, are your notes in such fashion that you can follow me quickly and promptly with some of these shoals? I want to take them up briefly. Will you turn to 13. That is the one where the fellow couldn't get out with the current meter. At what mile is that shoal?

A. Mile 109.3.

Q. How many miles upstream from that is your Shoal No. 14?

A. About 7/10 of a mile.

Q. How many miles upstream from your Shoal No. 14 is your Shoal No. 15?

A. About one mile.

Q. And how many miles upstream from that is your Shoal No. 16?

A. About 8/10 of a mile.

Q. And how many miles upstream is your Shoal 17 from the last one, from 16?

A. About 1.2 miles.

Q. And how many miles upstream from Shoal 17 is Shoal 18?

A. About 1.7 miles.

Q. And that one is 1,400 feet long, isn't it?

A. That is right.

Q. And the one back of it is 2,400 feet long?

1185 A. That is right.

Q. So that there is a lot of that distance taken up in shoals; is that right?

A. You by chance perhaps picked on the section of the river best augmented by shoals, or one of the best. I call your attention again to my statement on direct examination that about 15 percent of the channel consists of shoals.

Q. That is right and they are all put in between the pools, aren't they?

A. That is right.

Q. They weren't fortunate enough to put those 15 percent of shoals all in one place and the pools all in another; is that right?

A. Perhaps it is a good thing; otherwise the upstream navigator would get tired all in one place.

Q. They would get good exercise. How many miles above Shoal 18 is your Shoal 19? I want to be fair, because I think that is a little farther?

A. That is about 3.3 miles.

Q. And how far above that is your next shoal? That one was 2,000 feet long, was it?

A. Yes; 1.2 miles.

Q. Was that a long shoal too?

A. 1,000 feet. You understand, of course, Mr. Jackson, that these lengths of shoal are not continual lengths of maximum difficulty. Those lengths embrace a group of channel obstructions of some sort or other, which if one were to try to pass them there would be breathing spells in between.

Q. I understand there is not a continuous obstruction. How far above Shoal 20 is 21?

A. $\frac{1}{10}$ of a mile.

Q. How much?

1186 A. I beg your pardon—$\frac{5}{10}$.

Q. How far up is Shoal 22?

A. One mile.

Q. And how far is the next shoal, 23?

A. $\frac{8}{10}$ of a mile.

Q. And how far to the next shoal, 24?

A. 1.6.

Q. And how far to the next one?

A. $\frac{2}{10}$ of a mile.

Q. And those shoals are how long?

A. Which numbers?

Q. 24 and 25?

A. They are 300 and 600 feet, respectively.

Q. You go up to 26?

A. 26 is 1,000 feet long.

Q. How many miles above 25?

A. $\frac{3}{10}$ of a mile.

Q. And then there is a further extension of 500 feet upstream?

A. 500 feet upstream there is another minor ledge.

Q. Which you included in 26?

A. Yes.

Q. Now you come to 27. How much farther up is that?

A. Pardon me. That is included for reference in order to be sure that it is identified.

Q. How much farther up is 27?

A. 27 is 1 mile above 26.

Q. And how much farther is 28?

A. 28 is a shoal consisting of a group of ledges, the beginning of which is approximately 1/10 of a mile above 27.

Q. 1/10 of a mile above and that falls is three miles long, isn't it?

1187 A. That shoal is approximately two miles long.

Q. I understood you to say three on your direct?

A. I wish to correct that.

Q. You gave the mileage of 125 to 127, inclusive. What should it be?

A. I am not sure of these decimals but it is two miles long beginning at mile 125. That would be to the beginning of mile 127.

Q. Can you tell me how many ledges you found at those falls, that is your item 28?

A. I didn't count them because they graduate from those that are easily identifiable to those that are submerged and barely distinguishable but there are more than fifty.

Q. You would hardly have time to count them on a very rapid examination and survey like you made?

A. Well, I think I would had I cared to do it.

Q. You found the controlling channel there to be eight feet wide by one foot deep?

A. Yes.

Q. If you haven't done so, will you tell me what the stream flow was for the period June 22nd to 29th, inclusive, at such stations as you consulted?

A. The stream flow in this section of the river, as you understand, was continually fluctuating because of power waves being put out from power plants up stream. At Eggleston the maximum discharge during the period June 22nd and 29th was 2,530 second feet. The minimum was 1,480 which is only a little bit more than half as much. At Glen Lyn the maximum and minimum, respectively, were 2,770 and 1,740; at Hinton or near Hinton, at Pack's Ferry, 2,750 and 1,800.

Q. And did you have any figures for up around Radford, the upper end, above Eggleston?

1188 A. I have the figures for Allisonia for June 27th and 29th which show a variation from 2,190 second-feet to 1,030 second-feet.

Q. Have you got similar figures for these same places for July 13th and 15th?

A. I have some of them.

Q. Will you give what you have?

A. July 13th to 15th, the maximum flow at Eggleston was 2,180 second feet and the minimum 1,580. At Packs Ferry, just above Hinton, the maximum flow was 2,610 and the minimum 2,100.

Q. That is all you have?

A. Those are all that I have.

Q. At each of those places those flows were several times the minimum flow of the stream, were they not?

A. At each of those places? I have only definite recollection of the minimum flow at Hinton.

Q. You understand what I mean, the minimum flow during the time when you took your pictures compared with the record minimum flow?

A. That is what I was going to say. This flow at Hinton, which was the only place that I have any knowledge of the minimum flow, the record minimum flow, was considerably in excess, let me say, of the extreme minimum flow. However, these flows ranged around very closely to what would be called ordinary low water which is the minimum flow that occurs practically every year. You will understand that the minimum flow that you have reference to is an extreme minimum of record that occurred once in fifty years, or whatever the period of record is.

Q. I understand when you undertook to locate a channel in one of these shoals you found what you thought was the controlling section and that you didn't then undertake to follow that channel throughout the shoal lengthwise of the river to see what its shape might be and what curves it might make and that sort of thing?

A. Your question might be put a little bit more definitely. I think I would say yes, in a majority of cases I did under-
1189 take to find out what the channel was.

Q. You told me a while ago on cross-examination that you didn't walk up and down the length of the channel through the shoals; is that wrong?

A. That answer was correct. In the majority of cases I did not walk up and down any extensive length of river but in every case I was able to pick out the channel either by walking, which I did a number of times, or by tracing out the path of the maximum flow and having——

Q. That was something you did with your eye?

A. Yes.

Q. As a result of this training?

A. I did it by eye just as a Captain of a boat would see the channel by eye too.

Q. And did you find that all the channels were perfectly straight?

A. No; I did not.

Q. Did you find they were quite crooked?

A. A few of them were what would be called quite crooked. A number of them were by no means—let me say most of them were by no means straight but were channels that could be easily followed by boat.